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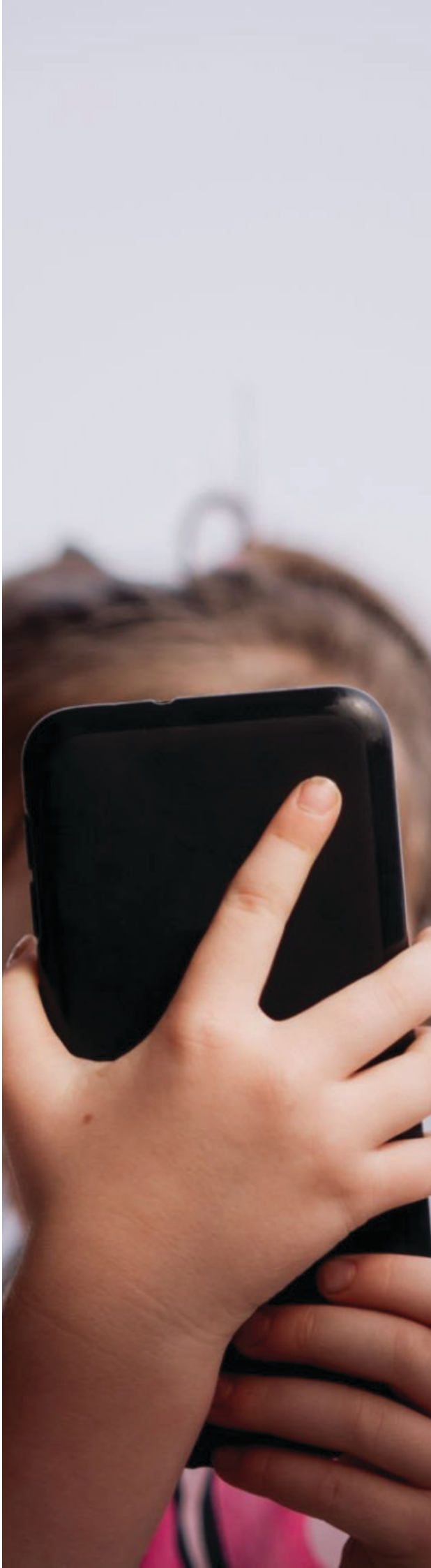
He Uru Kahikatea

Building young people's resilience through media and information literacy and digital citizenship skills

A report from the Prime Minister's Chief Science Advisor, Kaitohutohu Mātanga Pūtaiao Matua ki te Pirimia

Full report



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Foreword

This report was commissioned by PM Ardern and is part of a series of workstreams across government tackling the challenge of mis-, dis- and malinformation. We use the term polluted information to include all three terms, reflecting the problematic nature of our information landscape. We focus on how we might enable young people to be more resilient in this polluted landscape. Resilience is a contested term, and the title of our report – He Uru Kahikatea – is an acknowledgement that resilience sits at the level of communities, not individuals. There is strength in tackling this problem collectively.

In the current online environment, the need for media and information literacy and digital citizenship to build this resilience has never been more pressing. We focus on a systematic education approach to supporting media and information literacy and digital citizenship. While polluted information and other challenges young people face are not confined to the online environment and social media, the internet has amplified their reach and impact. The rapidly changing online and social media environment: artificial intelligence, new platforms, rising time spent online, platforms changing and adapting, and deepfakes, increasingly confront young people. The ability to decipher which information is credible is critical, and support to develop dispositions and attitudes which help young people interact positively online are urgently needed.

There is no silver bullet; rather, there is a need for a whole of system approach that supports teachers, schools, parents, caregivers, whānau, and young people, locally tailored to communities. The approach must also uphold Te Tiriti o Waitangi. This report does not make specific recommendations, which were outside our terms of reference, but does build an evidence base to support an approach within Aotearoa New Zealand. There is a need to expand the evidence base within the New Zealand context. This should include different mechanisms to track the impact of actions that seek to promote media and information literacy and digital citizenship at an individual classroom, school, and national level. The report outlines the importance of equipping teachers with knowledge, tools for assessment, and resources, and the role of three New Zealand curricula in promoting media and information literacy and digital citizenship. Ensuring that media and information literacy and digital citizenship are culturally and contextually relevant is pivotal to their success; this must occur along with community support and buy-in. We highlight the importance of including teachers, parents, caregivers, whānau, and the wider community in the journey.

We hope this report serves as a wero (challenge) to create a national approach to media and information literacy and digital citizenship, supporting young people as not only consumers of information but also critical thinkers and responsible digital citizens, ready to navigate the media and information landscape of today and prepared for the information landscape of tomorrow.

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Additional information about the authors can be found on the PMCSA website (pmcsa.nz)

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Key messages and executive summary

Key messages

These key messages provide a snapshot of the full report, and are elaborated in this executive summary.

Polluted information

- We use polluted information as a collective term for all types of contested information contributing to an online environment that causes harm to young people. This includes misinformation, disinformation and malinformation.
- Polluted information can cause harm; it is not restricted to the online environment or social media but has been amplified by them; enhanced media and information literacy and digital citizenship skills can protect young people from harm.

Media and information literacy and digital citizenship

- The online environment offers both opportunities and risks for young people. They need to be equipped with tools and strategies to maximise benefits and minimise harms.
- Media and information literacy and digital citizenship are needed to ensure young people can be resilient, especially in the context of a rapidly changing online environment.
- Beyond existing strengths in specialist media education, and in other parts of the curricula, media and information literacy and digital citizenship are most successfully learned when they are embedded in and across all curriculum learning areas.
- Digital skills, critical thinking, and social emotional skills are all foundational parts of media and information literacy and digital citizenship, and young people, whānau, and teachers need to be supported to have a baseline of these skills.
- Young people need access to media and information literacy and digital citizenship resources and strategies they can use for interacting with and supporting their peers.

Initial teacher education and in-service professional learning and development

- Initial teacher education (ITE) and in-service professional learning and development (PLD) already include critical analysis skills but should explicitly include opportunities for learning about media and information literacy and digital citizenship to equip teachers with the skills needed for their resilience as well as for teaching young people.

Support for schools, kura, and teachers

- Leaders in schools, kura, and Early Learning Services (ELS) need support to help grow teachers' confidence and competence in teaching media and information literacy and digital citizenship.
- Teachers need to be supported by resources and adaptable lesson plans for teaching that reflect different learning stages and disciplines, are relevant for the Aotearoa New Zealand context, and are numerous enough to be drawn on throughout the year.
- Parents, caregivers, and whānau need to be included in school, kura, and ELS initiatives with a view to increasing their understanding and ability to support young people in media and information literacy and digital citizenship.

Equity and Te Tiriti

- English medium schools, Māori medium schools, kura kaupapa Māori, and ELS will uphold Te Tiriti o Waitangi by ensuring equity in access and outcomes in media and information literacy and digital citizenship education for rangatahi Māori and communities (whānau, hapū, iwi).
- Programmes, resources, and adaptable lesson plans that are made by, alongside and with diverse communities including: Māori, Pacific, immigrants, refugees, neurodiverse, rural communities, disabled, and LGBTQI+ are all important in the New Zealand context.

A national approach, locally led

- A national strategy can be helpful in guiding media and information literacy and digital citizenship in the education system.
- A national level approach, whole of school approach, and classroom level approach to media and information literacy and digital citizenship, are all critical. Community expertise should also be integrated wherever possible.

Libraries

- Libraries and librarians already have expertise in media and information literacy and digital citizenship and can play a central role in designing and facilitating media and information literacy and digital citizenship initiatives – particularly as a means of growing collective community understanding, agency, and action.
- They need resourcing and support to do this, both to access qualified librarians and to upskill other staff through professional development.

Developing effective tools and measuring progress

- Meaningful measures of media and information literacy and digital citizenship capability for both young people and teachers are needed to evaluate success. These are not widely available, and challenging to design. Currently available measures that can be used for tracking effectiveness have been critiqued for their utility in New Zealand.
- Research and development is needed for designing effective instructional tools and measures that are fit for purpose and reflect the unique context of New Zealand.

Introduction

This report, He Uru Kahikatea: building young people's resilience through media and information literacy and digital citizenship skills, takes inspiration from the whakataukī 'He Uru Kahikatea', which refers to a stand of kahikatea trees. This whakataukī, and the report's broader title, speak to the idea that the root system of a stand of kahikatea trees is as deep and tangled as the tree is tall - which keeps them resilient and tenacious in the face of environmental challenges. Incorporating this whakataukī into the report's title reflects the importance of collective action, collaboration, and community approaches to resilience. Just as a stand of kahikatea is extremely difficult to fell because they are supported by the intertwined roots of other kahikatea, young people, schools, their whānau, and community are stronger together in the face of the mis-, dis-, and malinformation which pollute our information environment online. We use polluted information as a collective term for all three types of contested information. Polluted information is not restricted to the online environment or social media, but the advent of the internet and rapid advances in digital technologies and social media have amplified the pollution of the information landscape.

The report is centred on Aotearoa New Zealand, while drawing from international best practice. It presents a synthesis of evidence about the role the education system does and could further play to help young people navigate polluted information and build positive digital citizenship skills for interacting online. The context in which this occurs is complex and while there are substantive opportunities for young people in the online environment, there are also many challenges, including polluted information.

Local evidence and current provisions have been extensively investigated through consultation, document analysis, searching evidence and data bases and national and international case studies. This has necessarily been up to a particular point in time. We acknowledge developments in curricula and resources within different agencies are ongoing.

We use digital citizenship as a collective term for skills such as self regulation, perspective taking, and being empathetic, considerate, inclusive, and collaborative in the digital world. Media and information literacy is focused on the skills needed to critically engage with information, media, and digital technologies. Both media and information literacy and digital citizenship are key to building resilience in young people as they navigate polluted information and engage in the online environment.

Context

Young people are facing a complex and changing online environment

Young people are facing challenges, many of which existed long before the online environment, but which have likely been exacerbated by its proliferation. These include polluted information, radicalisation and extremism, privacy violations, image based abuse, cyberbullying, mental health challenges, and body image concerns. There are also many things that young people may gain from the online environment, including a sense of community and belonging. The technologies that are shaping the online environment are also changing and developing, these range from artificial intelligence (AI) to moderation techniques that social media platforms undertake, to how the things young people see on their social media is individualised through curation algorithms and AI. In this complex context, media and information literacy and digital citizenship skills are important to help young people minimise the risks, meet the challenges, and maximise the benefits of the online environment.

An opportunity for New Zealand

Media and information literacy and digital citizenship have had limited focus across the education sector. This presents an opportunity for the education system to strengthen the resilience of young people through a media and information literacy and digital citizenship initiative. The evidence base internationally and, in particular, nationally is still developing. There is a significant opportunity to enable a strengths based and community focussed approach when envisioning a media and information literacy and digital citizenship system in New Zealand.

A range of attitudes, dispositions, and skills to think critically and reason effectively with information is required to mitigate the challenges that young people face in the evolving dynamic, and complex digital landscape. This necessitates empowering educators and school leaders to understand and develop media and information literacy and the accompanying digital citizenship pedagogies, moving beyond monitoring and restricting young people online. Ongoing PLD and support for teachers across early learning, primary, and secondary education in English medium, Kaupapa Māori, and Māori medium is needed to ensure that they have the necessary digital competence and media and information literacy skills to effectively teach young people to navigate the online environment.

Challenges to consider

There are many challenges which key actors will need to consider. New social media platforms are constantly emerging; therefore, research that is peer reviewed, thorough, and held up to scrutiny is struggling to keep pace. To be effective, media and information literacy and digital citizenship skills need to be taught in ways that respond to, and ideally anticipate, the constant changes young people experience online and offline. This will support young people to develop the dispositions and sensitivities to act and adapt. Digital inequities are still prevalent among young people in New Zealand. Despite the significant, rapid actions of Te Tāhuhu o te Mātauranga | The Ministry of Education (MoE) to bridge the digital divide during the COVID-19 pandemic, there are still many Māori, Pacific, and young people from lower socioeconomic groups who face ongoing inequalities in access and usage. There are also significant differences between individual schools, kura, and ELS; these inequities need to be considered if implementing media and information literacy and digital citizenship in the education system.

International comparisons

Some of the countries highlighted in the literature as having successful responses to polluted information are examined. In these countries media and information literacy and, to a lesser extent, digital citizenship, have been successfully embedded into the curriculum, and there are national policies and strategies helping to guide media and information literacy and digital citizenship. Norway has a professional digital competence framework for teachers, which was introduced in 2017, in part as an acknowledgement that teachers must first be equipped with digital skills and understanding before they can teach their young people about digital issues and topics. Finland has a system which supports media and information literacy and digital citizenship, including media and information literacy being embedded in the national curriculum, and a governing body charged with promoting media and information literacy, producing resources and adaptable lesson plans, and coordinating media and information literacy throughout the country. Finland also has a network of NGOs that receive EU or government support to promote media and information literacy and digital citizenship and run innovative programmes and pilots. While Finland has challenges, including a lack of local adaptation for different communities, their system of media and information literacy and digital citizenship offers insights for New Zealand.

Research, lesson plans, and gamification

Research must underpin evidence based practice aiding the development of new programmes, adaptable lesson plans, resources, and evaluation measures. There is an evidence base to draw from internationally. The international evidence base shows that adapting programmes, lesson plans, and resources to the local context is key to their success. Adapting lesson plans and resources to different cultural and geographic contexts, and diverse learners more broadly, including Māori, refugee, immigrant, rural, LGBTQI+, and Pacific communities is important in the New Zealand context. This includes teaching media and information literacy and digital citizenship through games, which has met with some success internationally.

Skills, knowledge, attitudes, and dispositions are all important components which need to work together to build young people's resilience. Skills like questioning the intent of the creator or platform and their potential bias or lateral reading, where you stop viewing a piece of content and check what other sources say, are useful. Supportive dispositions and attitudes include reflecting on the impact content has on you and what impact it may have on others, or being inquisitive about the accuracy and intent of content.

Social and emotional skills are a foundational part of media and information literacy and digital citizenship. These skills can start during Early Childhood Education (ECE) and continue to be supported as young people move through to school and kura. For instance, emotional regulation is vital when reflecting on your own emotional reaction and intent behind information. Young people need to develop these skills and teachers need to be equipped to support them to do so during their education.

The challenge for key actors

When teaching media and information literacy and digital citizenship, young people and their teachers need to understand the intent behind content, how content is disseminated, platformed, and curated, and the actions social media and technology companies take offline. The evidence shows that designing curriculum content that relies on highly emotive, controversial, or polarising examples can be ostracising and ineffective; it is therefore important that media and information literacy and digital citizenship support young people in how to think, rather than what to think. Both the teacher and the young person need to be challenged to reflect on their own perspectives, biases, and values.

Supporting educators with adaptable lesson plans and a resource hub

There are limited existing examples of approaches and resources in New Zealand; they include those developed and made available through Te Kete Ipurangi, Netsafe, and Manaiakalani Education Trust (MET), alongside existing online resources from the global community. In Estonia, the Ministry of Education and Research has a common platform from which teachers can draw and adapt lesson plans from templates and share lesson plans and discuss polluted information issues with their peers. Building a media and information literacy and digital citizenship platform that provides peer reviewed resources and adaptable lesson plans could be vital, and the current curriculum refresh provides an opportunity to do this. Resources and lessons should be adaptable, reflect different learning stages and learning areas, and varied enough to use all year in different contexts. Having these programmes, resources, and lesson plans readily available and made by, alongside, and with diverse learners, teachers, and communities is a vital component of supporting media and information literacy and digital citizenship in the education system.

The curriculum

The three curricula in New Zealand all offer opportunities to embed media and information literacy and digital citizenship. The Early Childhood Curriculum, Te Whāriki, guides the sector's practice and was refreshed in 2017. Currently, some content is embedded within Te Whāriki to keep young people safe and secure online; however, there is the potential to further strengthen young people's digital capability. There are also places in the curriculum focused on social and emotional learning (SEL), which offer places to connect with media and information literacy and digital citizenship. For example, exploring emotional regulation in the Wellbeing | Mana whenua strand, or the importance of respecting others online in the Contribution | Mana tangata strand. When considering Te Whāriki, it is important that media and information literacy and digital citizenship concepts weave into the curricula for schools and kura.

The current curriculum refresh provides an opportunity to incorporate media and information literacy and digital citizenship. Currently, the New Zealand Curriculum (NZC) for English medium schools and Te Marautanga o Aotearoa for kura, and Māori medium schools set out the broad direction of what is taught, with the local curriculum guiding more granular direction set by schools. School leaders and teachers have the agency to adapt the curriculum to their local context in ways that meet young people's needs. In the NZC, there is potential to more explicitly and extensively include media and information literacy and digital citizenship as a key competency, while in Te Marautanga o Aotearoa there is potential to embed media and information literacy and digital citizenship in the principles and values and attitudes. In both these cases, embedding media and

information literacy and digital citizenship in parts of the curriculum that apply to each learning area is in line with the international evidence.

Different learning areas offer different opportunities. Some examples in each learning area (of the NZC) and wāhanga ako (of Te Marautanga o Aotearoa) are outlined below:

- English | Te reo Māori: there is potential to extend existing concepts, such as 'what the purpose of a text is' to include online multimedia content; this could include discussion about paid advertising.
- Mathematics and statistics | Pāngarau: how statistics, graphs and figures can be misrepresented or manipulated.
- Social science | Tikanga-ā-Iwi: the importance of critiquing online sources of information, and interrogating their accuracy, including the intent behind the creator, and the skill of lateral reading. Media and information literacy is important in both media studies and history.
- Technology | Hangarau: the ethics and technology of algorithms, AI, and targeted advertising and how these things can shape the online environment.
- Digital technologies | Hangarau matihiko: teaching children how to design their own digital solutions and become creators of, not just users of, digital technologies, to prepare them for the modern workforce.
- Health and physical education | Hauora: how to critically engage with fitness, wellness, and mental health 'experts' on social media and via the internet, and the importance of lateral reading, relational well being, and face to face professional expertise.
- Science | Pūtaiao: the importance of considering the process of scientific inquiry, or lack of scientific inquiry, when considering information online.
- The arts | Ngā toi: how images, videos, and audio can be altered, changed, and created with the intent to mislead and spread online, including deepfakes and AI. How people, places, and ideas are portrayed through media.
- Learning languages | Ngā reo: how different cultural perspectives and understandings can shape the online environment.

Each learning area offers an opportunity to embed media and information literacy and digital citizenship concepts. The international evidence highlights the importance of teaching whole concepts in every learning area. By teaching whole concepts, like lateral reading, critically thinking about the intent of the creator, critically ignoring, and reverse-image searching, young people will have these concepts supported across their learning. It is also important to consider that the curricula are already very full, and including media and information literacy and digital citizenship poses complexity for teachers. It is therefore vital that sufficient support and resources are provided to teachers and schools alongside the curriculum refresh.

National uptake, coherence, and consistency

A national-level approach, whole-of-school, kura, or ELS approach, and classroom-level approach to media and information literacy and digital citizenship are each critical. A focus on equitable opportunities, minimising the wide variance between schools', kura, and ELS providers' digital infrastructure and the digital competency of educators is a key part of a media and information literacy and digital citizenship programme's success. A national body supporting media and information literacy and digital citizenship is a common feature in countries succeeding in this area, with Finland having a national government body with legislative responsibility to promote media and information literacy and digital citizenship through producing resources for parents, caregivers, the education system, libraries, and NGOs, as well as conducting research and offering seminars and workshops. In these countries, the equivalent to New Zealand's Te Mana Whakaatu The Classification Office undertakes this work, with a dedicated team focused on media and information literacy and digital citizenship. A media regulator would be suited to carrying out this work, and there is potential to expand the remit of Te Mana Whakaatu The Classification Office to undertake this work in the New Zealand context.

Some teachers will need to be upskilled in their own media and information literacy and digital citizenship as well as learning how to teach these same skills to young people. Research has shown that teacher's ability to discern polluted information is roughly in line with the general population, therefore making it imperative to provide professional learning opportunities. For teachers, policymakers and researchers, the changing social media landscape including the rise of AI and video-focused platforms, pose serious challenges. The intent of the platforms is changing, and the amount of time that young people are spending on platforms is continuing to rise. Being responsive to these changes is imperative but made more difficult by the generational preferences in social media platform use. Offering ongoing professional learning opportunities in this area is therefore vital. Teachers need to know what young people are doing online, in a broad sense, in order to provide a curriculum that will support them.

Two avenues are particularly important, PLD and ITE. ITE requirements set by the Teaching Council of Aotearoa New Zealand emphasise supporting and developing critical analysis skills as preparation for the demands of teaching. They currently don't explicitly include media and information literacy and digital citizenship, but have the flexibility to adapt content to reflect current priorities and issues; therefore, content varies across providers of initial teacher education. If media and information literacy and digital citizenship were to be included in the curriculum and/or ITE requirements, pre-service teaching programmes would need capacity, capability, and resources to embed this into programmes.

The PLD system in New Zealand offers several avenues for a media and information literacy and digital citizenship programme to be delivered, through regionally allocated PLD and national adoption of approaches such as Kāhui Ako | Communities of Learning (CoLs). Each of these approaches has its challenges, regionally allocated PLD has limited places and competing priorities, a national approach is potentially resource-heavy and would need to be administered both online and in-person, and CoL have large variances between them, making consistent national uptake difficult. With each option, whole of school approaches are likely the most effective: this means that every teacher needs to be able to upskill, and that highly accomplished teachers may act as mentors in school settings. Teachers also need ongoing opportunities to upskill, not via a one-off course, and

any PLD will need to be supported by education leaders, including the allowance of time outside the centre or classroom, so teachers can undertake further learning. Schools, kura, ELS, and education leaders all need support to better understand and increase teachers' media and information literacy knowledge and digital citizenship skills.

Using libraries to disseminate information

Public and school libraries can play a central role in designing and facilitating media and information literacy and digital citizenship initiatives, particularly to grow collective community understanding, agency, and action. The libraries in Finland have funding to support schools through professional development and teaching young people classes focused on navigating the online environment. There is an opportunity in New Zealand to strengthen the role that libraries play as partners in tackling the polluted information landscape, with the National Library well placed to play a leading role.

Tracking progress and measuring success

A vital part of integrating media and information literacy and digital citizenship at a national level is ensuring that there are measures in place to evaluate the development of teachers' media and information literacy and digital citizenship competencies, alongside young people's progress. This is important to ensure consistency across the country and ensure that the programmes, adaptable lesson plans and resources that the government supports are optimising and growing young people's media and information literacy and digital citizenship skills. Meaningful measurement is challenging in this field, but there are a number of potential ways to monitor progress for both media and information literacy and digital citizenship. Progress needs to be assessed at a national level, potentially through assessments such as Programme for International Student Assessment (PISA), National Monitoring Study of Student Achievement (NMSSA), the Curriculum and Insights and Progress Study, some National Certificate of Educational Achievement (NCEA) standards and the Youth Health and Wellbeing survey, What-About-Me? At a school level, the National Wellbeing@school survey could include measures of digital citizenship and a school entry kete (a basket) could offer assessments of the skills of young people as they enter school or kura. At a classroom level, the Progress and Consistency Tool, Progressive Achievement Tests (PAT), and the Electronic Assessment Tools for Teaching and Learning (e-asTTle) could potentially be adapted to include concepts relating to media and information literacy and digital citizenship. There are also opportunities to create resources that help schools, kura, and teachers track young people's progress. Beyond this, there are options to assess schools' and teachers' capabilities, either through existing assessments like the International Teaching and Learning Survey (TALIS) or through a new monitoring assessment or survey that could occur before and after PLD focused on media and information literacy and digital citizenship, yearly, or when teachers are entering the workforce.

New assessments at all three levels could also be introduced, targeting specific areas of interest. Finland's Save the Children's Huippula is a gamified test for young people aged 10-12 years old focused on digital citizenship and media and information literacy skills and dispositions; the data is anonymised and then given to the teacher alongside adaptable lesson plans and topics that are most relevant given the responses. The data are collected at a school level, as well as regionally, and nationally. Giving a baseline for young people's capabilities at age 10-12, Save the Children aims to create a national benchmark that can be tracked year on year.

There are current opportunities in New Zealand, although somewhat piecemeal, to track media and information literacy and digital citizenship progress. There is further opportunity to expand current assessments and tracking to explicitly include media and information literacy and digital citizenship and for new assessment measures to be formed specifically focused on media and information literacy and digital citizenship.

Beyond the classroom

Learning is not just restricted to the school environment, and it will be important to consider the effect of a whole-community approach to fostering resilience in a young person. Including parents, caregivers, whānau, and other community members in media and information literacy and digital citizenship initiatives increases their own understanding and positively impacts their ability to support young people. Parents and whānau need readily available and culturally appropriate resources that equip them to have conversations with young people. Topics covered by these resources could be types of media, age ratings, benefits of media, social media, how to work out what sources of information to trust, and being an informed and responsible online user.

Supporting the adults around young people

Adults are not immune to polluted information, and a community approach can ensure that they develop their own skills and understandings. Adults fostering a balanced view of the online environment, and seeing the positives and challenges, is an important part of supporting young people in online contexts. Initiatives codesigned with the community are likely to work to meet the community's digital needs. When resources and adequate support are available, it can reduce the online risks and provide an opportunity to frame the digital space positively. They can enable parents to be aware and make informed choices about how the online space is utilised at home.

Strong identities can build resilience

Young people's identities and familial and cultural connections are all important protective factors for online safety. 'Offline identity' through cultural connection, community, and participation is important because young people are more likely to use help-seeking behaviours when they feel supported, safe, and part of a community. Importantly, because social media can act as a tool to connect people from socially isolated groups like LGBTQI+, disabled, and immigrant communities, it is vital to remember that some young people seek community and connection online and need to be supported to do so in a safe manner.

Concluding comments

Figure 1 summarises the key themes of this report. Central to mitigating the effects of polluted information and to developing positive skills for social media and the internet is the young person's strengths, not just as an individual but as part of a collective. Supporting the development of media and information literacy and digital citizenship requires a coherent and systematic national response involving schools, kura, ELS, teachers, school leaders, parents, caregivers, whānau, the wider community, and government.

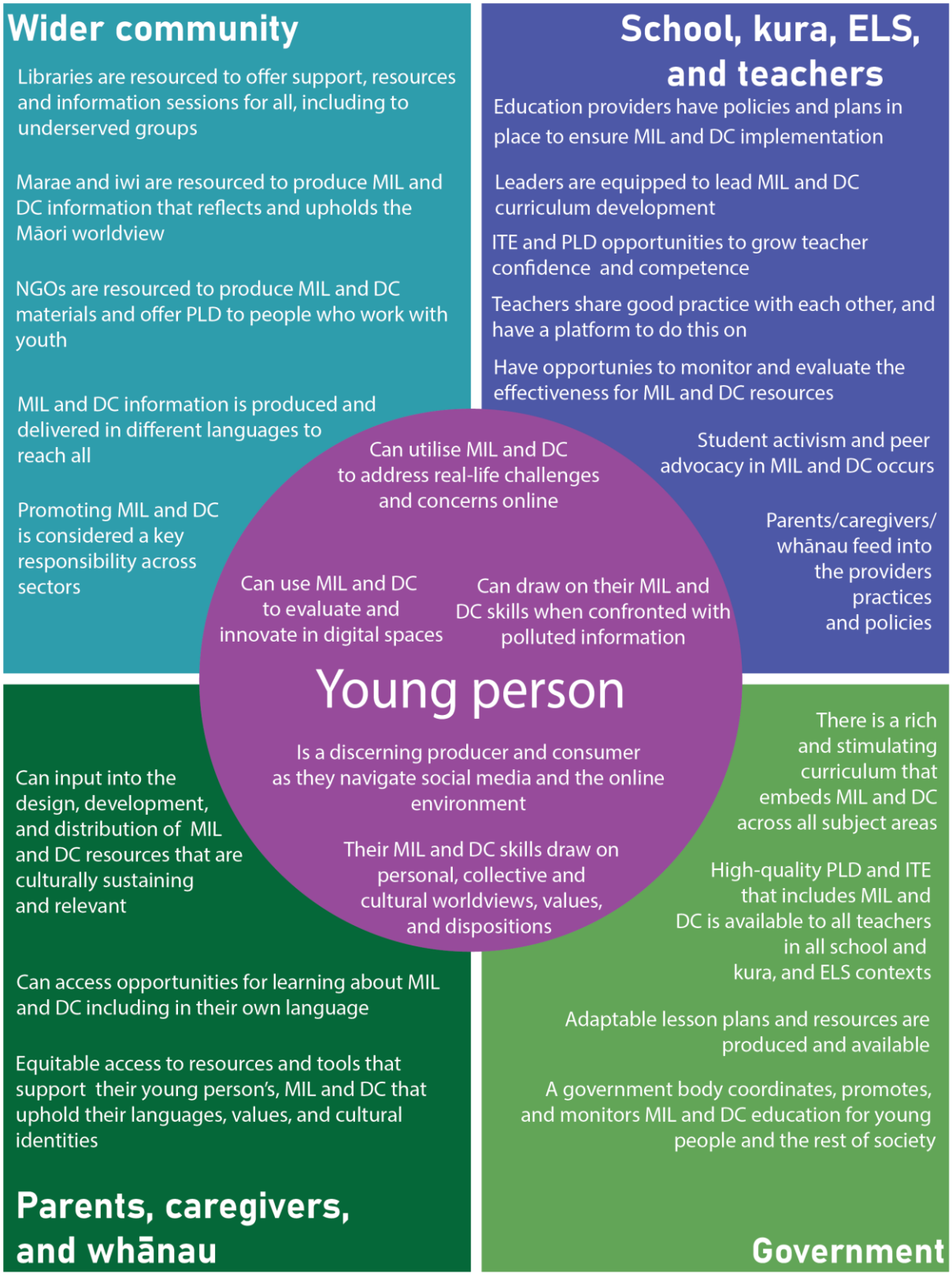

Figure 1: Centring the media and information literacy and digital citizenship system around the young person. MIL = Media and information literacy, DC = Digital citizenship.

Glossary

Aotearoa and New Zealand
For the purpose of this report, we use Aotearoa, Aotearoa New Zealand, and New Zealand interchangeably.

Algorithm
A wide range of definitions of algorithms exists in large part due to their complexity and different uses. This report adopts the broad definition used by Hīkina Whakatutuki | The Ministry of Business, Innovation, and Employment (MBIE): "Algorithms are automatic decision-making processes used by computer programmes to identify patterns in data."[1]

Artificial Intelligence system
The definition by the AI forum is used: AI describes "advanced digital technologies that enable machines to reproduce or surpass abilities that would require intelligence if humans were to perform them."[2]

Critical thinking
Critical thinking as used in this report is defined as the intellectually disciplined process of actively and skilfully conceptualising, applying, analysing, synthesising, and/or evaluating information gathered from, or generated by observation, experience, reflection, reasoning, or communication, as a guide to belief and action.[3]

Digital competence
Digital competence "is the confident, critical, and responsible use of, and engagement with, digital technologies for learning, at work, and for participation in society. It is defined as a combination of knowledge, skills and attitudes."[4]

Digital citizenship
Digital citizenship is the ability to act in our digital environments in ways that are safe and responsible, and to actively and respectfully engage in these spaces.[5] Our use encompasses positive social and emotional skills including self-regulation, perspective taking, and being empathetic; as well as being considerate, inclusive, and collaborative in the access, sharing and use of digital tools including social media.

Digital literacy
Digital literacy is the ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills.[6]

Disinformation
Disinformation is false or modified information knowingly and deliberately shared to cause harm or achieve a broader aim.[7]

Gaming
Gaming is playing an electronic video game, which is often done on a dedicated gaming console, computer, or smartphone. People who often play video games are called 'gamers'.

Gamification
Gamification involves turning the learning process, as a whole, into a game by applying game principles (e.g., point scoring, achievement badges, rules of play) to it in order to motivate and engage learners. Failure is a source of feedback and learning, collaboration is necessary, and learning and assessment are tightly integrated.

Information literacy
Information literacy is used in a variety of ways but defined here as the ability to recognise "when information is needed and have the ability to locate, evaluate and use the needed information"[8] and includes doing this in the online environment. Information literacy is most commonly used within the librarian sector and by researchers in this field.

Initial teacher education
Initial teacher education (ITE) refers to the qualifications attained by teachers before they enter the workforce. Currently, there are two main pathways: a Bachelor's degree (of Education or Teaching) with a focus on primary education or early childhood education; or a graduate diploma of teaching, either secondary, primary, or early childhood education, for people who have already finished an undergraduate degree. Internationally some countries refer to this as initial teacher training (ITT).

Kura
For the purpose of this report, kura includes kura kaupapa and Māori medium schools.

Lateral reading
A concept developed by Stanford History Education Group that refers to evaluating a source's credibility by comparing it with other sources in the online environment; this often means cross-checking resources.[9] This technique is often used by Factcheckers.[10]

Local curriculum
The local curriculum is enacted by schools, kura, and Early Learning Services (ELS) and is how the National Curriculum is brought to life. The local curriculum is focused on delivering for the specific young people within a school and allows a significant amount of autonomy by schools over the specifics of what they teach their young people.[11]

Misinformation
Misinformation is information that is false or misleading, though not created or shared with the direct intention of causing harm.[7]

Malinformation
Malinformation is a contested term considered as either a separate term or something encompassed in the term disinformation, where information that is based in reality is used to inflict harm on a person, social group, organisation, or country.[12]

Media and information literacy

Media and information literacy encompasses three overlapping concepts: information literacy, media literacy and information, and communications technology (ICT)/digital literacy.[13] There is a significant cross-over between the different forms of literacies often described in this space, with little consensus about the meaning or application of different terminology.[14] This report predominantly uses the term media and information literacy. Still, it acknowledges that other researchers, government officials, teachers, or members of the public may be more familiar with or have a preference for another term.

Media literacy

Media literacy is used in a variety of ways.[15] In this report, media literacy encompasses accessing, analysing, evaluating, and creating messages in various forms – from print to video to the internet. Media literacy includes understanding of the role of media in society as well as essential skills of inquiry and self-expression necessary for citizens of a democracy.[16,17]

Multiliteracy

Multiliteracy is "the skills to interpret, to produce and to evaluate different kind of texts. These skills help young people to understand diverse cultural forms of communication and to build their identity."[18]

National Curriculum

The National Curriculum for schools comprises two documents that provide a framework for state and state-integrated schools and kura in New Zealand to develop teaching programmes relevant to their local young people. There are two documents, The New Zealand Curriculum (NZC), used mainly by English medium schools and Te Marautanga o Aotearoa, used mainly by kura, and Māori medium schools.[19] The National Curriculum acts at a high level, while the local curriculum set by schools in their local context provides the details connecting the National Curriculum to pedagogy, reflects community values, culture, and identity, and is often developed in partnership with parents, caregivers, whānau, local iwi, hapū, and other community organisations as appropriate. There is also a high-level national curriculum for the non-compulsory early childhood sector Te Whāriki.

Older people

For the purpose of this report, older people are those over 60 years. This is based on the UN definition.

Polluted information

Polluted information is an umbrella term incorporating three different categories of information: disinformation, false and misleading information which is purposely spread; misinformation, false and misleading information that is spread unintentionally; and malinformation, information with some basis in reality that is spread with the intent to cause harm and diminish mana.[20]

Professional learning and development

Professional learning and development (PLD) is the process by which teachers upskill and develop knowledge once they have left initial teacher education (ITE) and are in-service. In New Zealand, teachers are required to complete PLD as part of meeting the requirements for their three yearly teaching re-certification.[21] Some funding is allocated to schools for these purposes.

Teachers
For the purpose of the report, teachers refer to those educators working in primary and secondary schools, kura, as well as Early Learning Services (ELS).

Vertical reading
Vertical reading refers to engaging deeply with a text and seeking to draw conclusions and analysis, without referring to other sources of information.[10]

Young people
For the purpose of this report, young people are those between the ages of 3-18.

Abbreviations

Abbreviation	Definition
AI	Artificial Intelligence
BFI	Big Five Inventory
BYOD	Bring Your Own Device
CoLs	Kāhui Ako | Communities of Learning
CRAAP	Currency, Relevance, Authority, Accuracy and Purpose
CYESS	Collective for Youth Empowerment in STEM and Society
DIA	Department of Internal Affairs
DNS	Domain Name System
DPMC	Department of the Prime Minister and Cabinet
DTTA	Digital Technologies Teachers Aotearoa
e-asTTle	Electronic Assessment for Teaching and Learning Tool
ECE	Early Childhood Education
e-LPF	e- Learning Platform Framework
ELS	Early Learning Services
ERO	Education Review Office
HDCA	Harmful Digital Communications Act 2015
ICILS	International Computer and Information Literacy Study
ICT	Information and Communication Technology
IT	Information Technology
ITE	Initial Teacher Education (also termed ITT in other countries)
ITT	Initial Teacher Training (termed ITE in New Zealand)
LIS	Library and Information Science
LLMs	Large Language Models
MBIE	Hīkina Whakatutuki | Ministry of Business, Innovation, and Employment
MET	Manaiakalani Education Trust
MoE	Te Tāhuhu o te Mātauranga | The Ministry of Education
MSD	Ministry of Social Development
NCEA	National Certificate for Educational Achievement
NGO	Non-Governmental Organisation
NMSSA	National Monitoring Study of Student Achievement
NZC	New Zealand Curriculum
NZCER	New Zealand Council for Education Research
NZQA	New Zealand Qualifications Authority
OECD	Organisation of Economic Cooperation and Development
PAT	Progressive Achievement Tests

PaCT	Progress and Consistency Tool
PB4L	Positive Behaviour for Learning
PDC	Professional Digital Competence
PISA	Programme for International Student Assessment
PLD	Professional Learning and Development
SDQ	Strengths and Difficulties Questionnaire
SEL	Social and Emotional Learning
SES	Socioeconomic Status
SLANZA	School Libraries Association of New Zealand Aotearoa
STEM	Science, Technology, Engineering, and Mathematics
TALIS	The Teaching and Learning International Survey
TEC	Tertiary Education Commission/Te Amorangi Mātauranga Matua
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific, and Cultural Organisation
YAP	Youth Advisory Panel

Reo Māori terms

We note that some words can have multiple meanings. Where appropriate, translations are taken from the Māori Dictionary, based on their use in the report.

Word	Definition
Akonga/Ākonga	Learner/learners
Aotearoa	New Zealand
Hangarau	Technology
Hauora	Health
Hui	Meeting, gathering
Kaitiakitanga	Guardianship, stewardship
Kaupapa	Topic, initiative
Kawa	Protocols
Kete	Basket, kit
Kōrero	Discussion, conversation
Kotahitanga	Unity, togetherness
Kura	Schools, including kura kaupapa and Māori medium schools
Kura kaupapa/kura kaupapa Māori	School operating under Māori custom and using te reo Māori as the medium of instruction.
Mana	Authority, status, prestige
Mana motuhake	Separate identity, autonomy, self-government, self-determination, independence, sovereignty, authority - mana through self-determination and control over one's own destiny.
Mana tangata	Power and status accrued through one's leadership talents, human rights, mana of people.
Mana whenua	Territorial rights, power from the land, authority over land or territory, jurisdiction over land or territory
Manaakitanga	Hospitality, kindness, generosity
Mātauranga	Knowledge, wisdom, understanding
Ngā reo	Languages
Ngā toi	Visual art
Pāngarau	Mathematics
Papatūānuku	Earth, Earth mother
Pūtaiao	Science
Rangatahi	Young person
Rangatiratanga	Authority
Tangata Tiriti	People of the Treaty
Tangata whenua	Indigenous people of Aotearoa
Te reo Māori	The Māori language

Te reo Pākehā	English
Te Tiriti/Te Tiriti o Waitangi	The Treaty/ The Treaty of Waitangi
Tikanga	Protocol, practice
Tikanga-ā-Iwi	Social science
Tirohanga Māori	Māori worldview
Tuakana teina	Peer learning, mentorship,
Tūpuna	Ancestors, grandparents
Tupuranga	Area to grow, or strand in the curriculum
Wero	Challenge
Whakapapa	Geneaology, lineage, descent
Whakataukī	Māori proverb
Whakatika	Correct, rectify, amend
Whānau	Family, extend family, those who act like family
Whanaungatanga	Relationship, kinship, sense of family connection

1. Context

E ngā pou o te ako, e ngā pūtake o te mārama, e ngā mana o te iwi, tēnei ngā mihi atu ki a koutou. Ānei te kāhui rangahau e whāriki atu nei tēnei pūrongo i mua i te aroaro. Hopukina mai, wānangatia, kōrerotia, me whakamahingia. Nā reira, huri noa i te motu whānui, tēnā koutou katoa.

1.1 Introduction

This report, He Uru Kahikatea: building young people's resilience through media and information literacy and digital citizenship skills, takes inspiration from the whakataukī 'He Uru Kahikatea' which refers to a stand of kahikatea trees. This whakataukī, and the report's broader title, speak to the idea that the root system of a stand of kahikatea trees is as deep and tangled as the tree is tall - which keeps them resilient and tenacious in the face of environmental challenges. Incorporating this whakataukī into the report's title is a nod to the importance of collective action, collaboration, and community approaches to addressing online harm and polluted information. Just as a stand of kahikatea is extremely difficult to fell because they are supported by the intertwined roots of other kahikatea, young people, schools, their whānau, and community are stronger together in the face of the mis-, dis-, and malinformation which pollute our information environment online.

We use polluted information as a collective term for all three types of contested information, as detailed in Section 1.3.

As Kuo has noted "framing decisions to share information as individual responsibility does not respect the intersecting structural harms that play into decisions that individuals make."[22]

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While we draw on international best practice, this report is centred on the New Zealand context. As well as a select review of the national and the international literature, we have listened to a broad range of stakeholders and include a strong focus on the ideas, values, and principles we seek to uphold in our education system, including a commitment to Te Tiriti o Waitangi. All schools, Early Learning Services (ELS), kura, school leaders, teachers, community, and government organisations must be cognisant of, and responsive to, Aotearoa's unique context while providing for their local communities. The Education and Training Act 2020 stipulates that schools and government organisations must uphold Te Tiriti by:

- Working to ensure their plans, policies, and local curriculum reflect local tikanga Māori (protocols), mātauranga Māori (knowledge/wisdom), and te ao Māori (Māori worldviews).
- Taking all reasonable steps to make instruction available in tikanga Māori and te reo Māori.
- Achieving equitable outcomes for rangatahi Māori.

These objectives put Māori identity, language, and culture at the core of education for Māori, acknowledging that rangatahi Māori must be engaged, challenged, and affirmed in their identity in the school environment. In the case of this report, we are particularly interested in the ways polluted information influences and shapes the ways rangatahi Māori think and act for themselves and their communities. The New Zealand Curriculum (NZC) outlines that schools should provide an environment where Māori and non-Māori young people recognise one another as tangata whenua and tangata Tiriti, and that every culture is valued for the contribution it brings. For media and information literacy and digital citizenship initiatives to be effective, programmes, policies, and strategies must build on young people's culture as a strength and be responsive to different young peoples' cultural needs, in our complex multicultural context. The current curriculum refresh affords an opportunity to embed media and information literacy and digital citizenship to support these goals.

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This report takes a strengths based approach, recognising that teachers are professionals and experts who are committed to young people, while simultaneously seeking to understand what can be improved in the curriculum, leadership, teachers' practice, and whānau and community engagement, to counter the negative impacts of polluted information.

We review evidence relating to the dispositions and knowledge gained by young people when they engage with two sets of related competencies and skills. One set of skills involves reasoning effectively online and thinking critically about the media and information literacy skills needed to navigate polluted information. This includes making judgements about the reliability, accuracy, believability, and usefulness of information. Complementary to these are a second set of social skills, including online forms of interpersonal capabilities (e.g., perspective taking, empathy, and prosocial skills) and those that are intrapersonal (e.g., self-regulation and persistence).[23] These skills add to young people's resilience because they can reduce engagement with, and the creation of, polluted information, including for inter-group animosity[24], racism, and cyberbullying.[25] More positively, these social skills can be utilised for prosocial engagement on social media and through everyday digital utility, including for online games.[26] Digital citizenship, therefore, enables other engagements in both local and global communities, with knowledge, critical reasoning, understanding, compassion, and a responsibility to look after each other online.

Digital citizenship, therefore, enables other engagements in both local and global communities, with knowledge, critical reasoning, understanding, compassion, and a responsibility to look after each other online.

1.2 What are media and information literacy and digital citizenship?

In this report, we use the terms media and information literacy and digital citizenship. Media and information literacy encompasses three concepts that while overlapping are distinct: information literacy, media literacy, and information communication technology (ICT)/digital literacy. Media and information literacy therefore acts as an encompassing term, to showcase the importance of critically engaging with information, media, and digital technologies. We use the term digital citizenship for a broad focus on how young people can positively use media and digital tools to interact and participate in the digital environment. Media and information literacy imparts knowledge about the functions of content providers and those organisations that seek to mediate them, and digital citizenship considers how young people are connected to both a local and an international environment and can be encouraged to act as digital global citizens.

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1.3 The polluted information environment

Polluted information is an umbrella term for three different categories of information: disinformation, false and misleading information that is purposely spread; misinformation, false and misleading information that is spread unintentionally; and malinformation, information with some basis in reality that is spread with the intent to cause harm and diminish mana.* Although it has attracted some critique,[27] the term polluted information is useful in that it allows movement beyond questions of how to categorise information and who is to blame. Instead, the term acknowledges that we must collectively find ways to navigate the polluted information environment.[20]

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1.4 Resilience: from individual to collective

The literature on resilience has generally focused on the individual and their emotional skillset and characteristics, particularly in times of adversity. There has also been a focus on 'what makes people inherently resilient'.[28] This framing of resilience has drawn significant criticism, as blame and responsibility is inadvertently shifted to the individual rather than the environment and context that allowed the adversity to occur.[29] The term, shaped by this critique, has seen new definitions which allow a collective responsibility and community envisioning of resilience. Resilience is used in this collective sense throughout the report.[28] For Māori, culture, and community form the basis of

* The term is drawn from 'You are here: A field guide for navigating polarized speech, conspiracy theories, and our polluted media landscape' written by Whitney Phillips and Ryan Milner.[20]

wellbeing and are the key foundation for resilience. Intergenerational connection is vital in individual's knowing and being part of a community much larger than their immediate family. This conceptualisation allows for a deep framing of resilience for both Māori and non-Māori alike. The notion of collective resilience focuses on more than our individual capacity for resilience, taking into consideration our community connections and networks from which we can draw strength and resilience.

If New Zealand is to be resilient to polluted information, whole communities must be resilient, not just individuals.[28] While individuals make up communities, this report promotes a collective approach to mitigating polluted information through media and information literacy and digital citizenship as the ultimate goal for New Zealand. Not all individuals are impacted by polluted information equally, and so careful consideration of groups that have institutional distrust is required.[22]

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1.5 Mana: the power and potential of individuals, teachers, and communities

The concept of mana is central to this report, providing a means for critiquing and understanding programmes, policies, and curricula. From a Māori perspective, each young person is born with mana inherited from their tūpuna (ancestors), those who came before them.[30] This strengths based conceptualisation imbues all young people with the potential and power to positively transform the world around them, while upholding the mana and dignity of others.

While the concept of mana is deeply embedded in te ao Māori, it can be drawn on as an important concept for non-Māori young people too. A social psychological model of student wellbeing called The Mana Model[31] posits that student thinking, behaviour and wellbeing at school is motivated by mana. The Mana Model identifies the ways connectedness to others, a sense of belonging, self efficacy, a range of social-psychological competencies, and humble regard for others are crucial foundations for learning. Teaching about media and information literacy and digital citizenship through a framework like mana would enable a focus on the positive skills that enhance mana and re-conceptualise the digital environment as a vehicle for enhancing both individual and collective mana and wellbeing.

Mana can also be experienced collectively, and it is critical that young people know they are an important contributing member of their school, their whānau and the wider community. Upholding mana in all these spaces is as important as individual mana. Māori have been enthusiastic adopters of digital technologies and have used numerous platforms to produce media that has portrayed te reo, tikanga, and mātauranga Māori in ways that have transformed the lives of Māori individuals and communities.[32] Polluted information can thus be framed as a challenge to the mana of both the individual and the collective. When teaching media and information literacy or digital citizenship, it is helpful to focus on upholding peoples' mana, allowing safe space for people to challenge, change their opinion, or engage with difficult kōrero while having respect for both the individuals and the collectives to which they belong.[33]

Polluted information can thus be framed as a challenge to the mana of both the individual and the collective.

Understanding all young people's cultural backgrounds and being responsive to their needs is vital. While there are concepts and aspects of media and information literacy which are transferrable across all cultures, the inclusion of concepts that are culturally relevant and pertinent for each young person will increase the relevance of the learning.[34] Teachers are well placed to understand their local communities and contextualise their teaching of media and information literacy and digital citizenship.

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1.6 The time is TikToking: research struggles to keep up with the rapidly changing landscape

The social media landscape is rapidly and constantly changing, making it difficult for research and the education system to keep pace.[35] New social media platforms are emerging[36] with different functions, intents, algorithms, and risks to their predecessors. Platforms are also changing rapidly, with algorithms, user and community guides, and advertising all being changed or altered weekly. Research that is peer-reviewed, thorough, and held up to scrutiny is attempting to keep pace with a moving target that will have changed by the time the research has been published. The time for research findings to inform policy is even longer, if this is done at all. This means the social media landscape is always ahead of research, policy, and practice. Indeed, it has changed significantly during this project. However, there are core concepts that are fundamental to media and information literacy that when carefully applied to new media contexts continue to be relevant and key to successful intervention.

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Te Tāhuhu o te Mātauranga | The Ministry of Education (MoE) is undertaking a curriculum refresh from 2021 to 2027,[37] presenting an opportunity to address media and information literacy and digital citizenship. The Curriculum was last set in 2007, before the advent of Instagram or Snapchat. Digital technology | Hangarau matihiko is an integral part of the curriculum and was revised in 2018, as a reflection of the substantive changes which had occurred in the prior ten years.[37,38]

Apart from general references to critical thinking in learning areas and key competencies, the NZC currently does not include guidance on how to support young people to participate in the digital environment. To be effective, media and information literacy and digital citizenship need to be taught in ways that traverse the constant changes young people experience online and offline, with a curriculum that supports this.

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1.7 Young people are spending more time online

Changes to social media platforms have been coupled with an overall increase in the time young people spend online and the extent to which this permeates many aspects of their lives. This increase is seen both in school with the rise of digital learning, and at home, where personal device use and gaming has increased.[39] There is a body of research that has explored the amount of time that young people are spending online, for example:

- The Organisation of Economic Cooperation and Development (OECD) found that 15 year olds markedly increased their internet use between 2012 and 2018, for young people in New Zealand it doubled to over 40 hours per week.[39]
- A report by the US Surgeon General highlighted that 95% of young people ages 13-17 report using social media and that more than a third of those use social media almost constantly.[40]
- The American Psychological Association published a report in 2023, noting that "using social media is not inherently beneficial or harmful to young people", and that "in most cases, the effects of social media are dependent on adolescents own personal psychological characteristics and social circumstances."[41]
- A 2018 New Zealand study by Netsafe, which interviewed 1,001 youth aged between 14–17 about their internet usage, found that 33% of teens spend four or more hours online in an average day, 38% were online for between two and four hours and 20% for one to two hours. The remaining respondents were online for less than an hour or were unsure about how much time they spent online.[42]
- A study from the University of Otago that tracked 11–13 year olds screen time by wearable cameras during 2014/15 found young people spent, on average, more than 33% of their time on screens.[43]

A study from the University of Otago that tracked 11–13 year olds screen time by wearable cameras during 2014/15 found young people spent, on average, more than 33% of their time on screens.

While the exact amount of time that youth spend online in New Zealand is challenging to capture, research shows that social media and the internet are deeply embedded in young people's lives. The national survey 'What about me?'* found that rangatahi Māori and females felt that social media was especially important in their lives, when compared to the wider cohort. The survey showed some young people worried about internet use, and safety online, with those expressing concern more likely female, Māori, disabled, and/or part of LGBTQI+ community.[44]

Young people are digitally connected at school. A report by the MoE, based on the Programme for International Student Assessment (PISA) data from 2018, found that 80% of young people had access to an internet connected laptop at school, and about 50% had access to an interactive whiteboard or tablet.[45] There are inequities in access to, and use of, digital devices and Wi-Fi, reflecting digital divides, see Annex 1. Each of these trends was exacerbated during the pandemic. There is not currently sufficient evidence to show a causal link between social media use and youth mental health. However, the US Surgeon General's report into the impact of social media on youth mental health highlights that there is also currently not enough evidence to suggest that social media is sufficiently safe for young people.[40] While we have given young people access to the many advantages of the internet, we arguably haven't given them adequate skills to navigate the environment to maximise the benefit and avoid the risks.

COVID-19: even more time online

The amount of time young people from primary to university level spent using online devices increased significantly during COVID-19, mainly during levels 3 and 4 in New Zealand.[46] The COVID-19 period required a profound shift to online learning, with both young people and teachers operating in an unknown environment.[46,47] The online environment provided vital access to learning during the crisis. The amount of time online outside of education also increased, as this became the predominant way of spending time with friends and whānau. Through the pandemic, young people and their educators became more accustomed to teaching online. However, there remains a strong preference for face to face teaching and learning from both teachers and young people.[48] The impacts of COVID-19 were not felt equally, as outlined in Section 1.11, emphasising the importance of ensuring all our young people have access to the digital environment, and the skills to navigate it.

Online/offline: for young people they are often one and the same

The online environment permeates almost every part of young people's lives. It is most obviously present in social media, gaming, and Googling information but extends beyond this to listening to music on Spotify, keeping a diary on Outlook, reading a book on e-books, using the library, doing an assignment, ordering groceries, doing homework, making a doctor's appointment, using Google maps to find a destination, checking the weather, receiving emergency alerts and much more. While this report uses the term online, there is research indicating that this distinction for young people is largely arbitrary and that they envision their lives online and offline as a continuum. The report distinguishes between offline and online in order to situate particular challenges facing young people in the online aspects of their lives, but we acknowledge that in young people's experiences there may be no clear distinction[49] and that polluted information also occurs offline.

* *Whataboutme?* in 2021 surveyed 7,209 12-18+ year olds from across New Zealand.[44]

The report distinguishes between offline and online in order to situate particular challenges facing young people in the online aspects of their lives, but we acknowledge that in young people's experiences that there may be no clear distinction and that polluted information also occurs offline.

1.8 The rise and fall of social media platforms

Young people are facing a challenging and dynamic online landscape. Social media platforms' rise (and fall) is part of the changing online landscape. Platforms once seen as embedded in the social media landscape are being overtaken by new platforms. Research from the Pew Research Center compared 13-17 year olds social media use in the US in 2022 to that in 2014-15. The survey (Table 1) showed that the platforms that young people use have changed: TikTok was only established in 2018 and is now the second most used platform after YouTube.[36] Most teenagers are now using YouTube, TikTok, Instagram, and Snapchat, while a minority use Facebook which has gone from the most used platform in 2014-15 to the fifth most used in 2022.[36]

Table 1: Data from Pew Research Center Teens, Social Media and Technology 2022 report, which surveyed 1,316 13-17 year olds.[36] This data predates the rapid uptake of Threads[50] and doesn't include many other platforms such as Telegram or Discord.

Social media platform	2014-15	2022
YouTube	Not recorded	95%
TikTok	Not recorded	67%
Instagram	53%	62%
Snapchat	41%	59%
Facebook	71%	32%
Twitter (now X)	33%	23%
Twitch	Not recorded	20%
WhatsApp	Not recorded	17%
Reddit	Not recorded	14%
Tumblr	14%	5%

Pivot to video

The research shows a movement to platforms focused on video, with TikTok and YouTube solely video platforms and Instagram increasingly focused on Instagram reels. This mass movement has been labelled as a 'pivot to video'[51] and has seen huge investment, particularly in short-form video by both social media platforms and advertisers. TikTok and YouTube are platforms focused on users viewing content.[52] Viewing is primarily for entertainment and secondarily for connecting with your social circles online, a shift from earlier platforms like Facebook, although the two use cases are not always distinct. Viewing content also results in viewing advertising, the primary mode of revenue for social media companies along with selling user data. Platforms primary focus is therefore keeping users on the platform for as long as they can and keep them coming back.

For policymakers and researchers, the decline in some earlier social media platforms and the rise of new video-focused platforms poses serious challenges. The algorithms are different, the intent of the platforms is changing and the amount of time that young people are spending on platforms is continuing to rise. This is in large part due to the algorithms being focused on ensuring that young

people are spending as much time online as possible.[53] Being responsive to these changes is made more difficult by the generational divide in social media platform use, as seen in Table 2.

Table 2: Data adapted from the Pew Research Center, Survey of US adults conducted in 2021.[54] This data predates the rapid uptake of Threads[50] and doesn't include many other platforms such as Telegram or Discord.

	% of US adults who use various social media platforms			
Social media platform	18-29 years	30-49 years	50-64 years	64+ years
YouTube	95	91	83	49
TikTok	Not recorded	Not recorded	Not recorded	Not recorded
Instagram	71	48	29	13
Snapchat	65	24	12	2
Facebook	70	77	73	50
X (formerly Twitter)	42	27	18	7
Twitch	Not recorded	Not recorded	Not recorded	Not recorded
WhatsApp	24	30	23	10
Reddit	36	22	10	3
Tumblr	Not recorded	Not recorded	Not recorded	Not recorded

Researchers, teachers, parents, caregivers and whānau are attempting to support and understand what content young people are engaging with, but many do not have the knowledge of new platforms. Equipping researchers, parents, caregivers, whānau, and teachers, with the skills and understanding of the changing social media landscape is an important start to ensure that they can support young people to think critically when interacting in digital contexts.

1.9 Young people are curating their image on social media

The online environment does not always reflect the offline environment. What young people share publicly online is often carefully curated and may showcase only the best and happiest parts of their lives.[49] The internalisation of what social media portrays as the idealised life and the ideal person has an impact on social media users.[55] Seeing parties, events, and gatherings of peers can create feelings of social exclusion and missing out.[56] Young people who share seemingly normal and every day experiences online can face ostracisation from peers. Sharing mental health journeys can lead to questions of authenticity amongst peers with some seeing the discussion of such issues as attention-seeking behaviour.[49] Young people are therefore further pressured into presenting a curated life, as they know sharing the negative parts of their life will impact them socially.[49]

What young people share publicly online is often carefully curated and may showcase the best and happiest parts of their lives… as they know sharing the negative parts of their life will impact them socially.

There are some spaces where young people can share the harder parts of their life, including via private and secondary accounts, usually followed only by close friends, which allows them to be more open.[49] But overall, the content and persona that young people present on social media is not

likely to reflect their day to day lives, giving a distorted perception of what their life and more generally 'normal life' looks like. There has been a small movement away from this with the platform BeReal, where you take candid photos for close friends, at random times when the app sends a notification. The concept is that the images will show a more authentic side of people's lives. BeReal has remained a small player, and seen a drop off in users, with daily users dropping from its peak of 20.0 million in October 2022 to 10.4 million in February 2023.[57]

1.10 Streaming, gaming, forums, and chatrooms

The online world extends past social media sites and apps into gaming, streaming, chatrooms, and forums. Many of these platforms offer anonymous social interaction, which can be positive, especially for those who struggle with in-person relationships.[58] However, using these platforms present risks, especially for vulnerable young people lacking sufficient media and information literacy or digital citizenship skills. Gaming and metaverses, streaming, chatrooms, and forum discussions can potentially spread polluted information. Young people and their parents, caregivers, and whānau need to be aware of the benefits and the risks of these online activities.

Gaming and metaverses

Video games are in a constant process of evolution, increasingly becoming more interactive and immersive with the expansion of Metaverses such as Roblox and Fortnite.[59] Research has shown that there can be some positives to gaming, including helping with stress, loneliness, anxiety, and psychological detachment, and providing relaxation and a social life.[60-62] However, despite these benefits, there is a risk of problematic behaviours that can emerge with gaming that can compromise social interactions and relationships offline.[59,61] Some of these problematic behaviours, such as bullying and anti-social behaviours, show up on the popular Science, Technology, Engineering, and Mathematics (STEM) based educational game – Minecraft.[63]

Streaming

Streaming platforms allow millions of users to watch others play games online, or live broadcast other user-generated content.[61,64] Twitch – the most notable example, has a young user base where users log their experiences in real and virtual worlds in real-time,[65,66] Many users watch these streams to learn gaming strategies and interact with other fans, but they can include content that is potentially harmful.[61] Streams with many viewers tend to have chat windows that can have problematic conversations that can include harassment, offensive or inappropriate content, and toxic chat.[61,64,65] Even when streaming platforms have human and/or artificial intelligence (AI) moderators, and not all do, they often miss nuances, use of emojis, and purposeful misspellings. See Annex 1 for more on moderation practices.[65]

Chatrooms and forums

Interactions between users also occur in chatrooms and forums, such as Reddit. These interactions can be public or private, and not all content is moderated, depending on the nature of these platforms. There is a well-documented body of evidence that outlines the potential for grooming to occur on these sites.[67]

Discord is an example of a chat application with voice communication that has a history of failing to remove or moderate white supremacist content. It is now a platform popular with online gamers, and even used in classrooms by teachers.[63,68,69] Discord can be used by teachers as a tool, with the platforms launching student hubs specifically designed for classroom use and is potentially helpful if

remote learning is required. There is some moderation on Discord.[68] When considering platforms like Discord, their potential usefulness in the learning context needs to be balanced with the risks associated with them.

1.11 Digital divide

The digital divide refers to inequitable access to digital devices, education, and the online environment and skills and knowledge,[70,71] highlighting differences in those who can and do participate in digital platforms. During COVID-19, the digital divide was exposed internationally. The United Nations Educational Scientific and Cultural Organisation (UNESCO) estimated that 50% of all young people worldwide were without access to a digital device during COVID-19 and more than 40% had no internet connection at home.[72] The divide was also exposed in New Zealand, with inequitable access to devices and reliable internet connection throughout New Zealand, with rural, Māori, and Pacific young people particularly impacted. The MoE took steps to remedy this, distributing 45,000 laptops and hundreds of modems.[73] The MoE also sought to connect those without internet access at home, which they estimated to be between 60,000 to 80,000, setting up modems, satellite dishes, and towers.[73]

There is still inequity in this area, particularly for Māori and Pacific young people,[74,75] and more work must be undertaken to ensure that all young people have reliable access to devices and internet at home. In schools, there are also large differences between the types of devices and number available, see Annex 2. The digital divide manifests itself from another angle: not all young people are receiving the same level of digital education. Currently there are schools focused on integrating digital learning, like Pegasus Bay School and Rotorua Primary School (discussed in Section 5, Case study 10 and Case study 11),[76,77] while other schools are not. In order to support media and information literacy and digital citizenship skills**,** all teachers need the skills and knowledge to equip young people with the skills for the online environment and polluted information, combined with equitable access to technology and support to achieve this.

…not all young people are receiving the same level of digital education.

1.12 Young people are facing challenges, many shaped by the changing and complex social media landscape

The social media technological landscape

The social media landscape is constantly changing (see Section 1.8), with platforms regularly altering their code, algorithms, moderation, community guidelines, and practices. Social media companies continue to operate with varying degrees of openness and transparency about how their platforms function, what data is being collected, and how it is being used. Some of the core social media technologies shaping social media sites are summarised and Annex 1 details the benefits and risks that each pose:

- Curation algorithms that dictate what content young people see on their social media accounts and actively downgrades some trusted sources.[78]

- Moderation, which refers to removing or managing content on platforms, is a process that occurs either after the content has been posted (ex-post) or through algorithms, AI, or a mix of all three, see Case study 1.
- Deepfakes, which through AI technology, can alter or superimpose videos, images, and audio to look like other people or change what is occurring.
- Community and user guidelines, which are formed by social media companies, dictate the content and behaviour which is acceptable on their platform.
- Paid advertising is the primary revenue stream for social media platforms, and data collected about individuals helps to target advertising to those most likely to engage.
- ChatGPT, and other Large Language Models (LLMs), are AI platforms which create credible text from prompts and can rapidly generate and spread polluted information.

Case study 1: How moderation (doesn't) work

The prominent example of influencer Andrew Tate and his presence on social media shows the complexity of navigating the line between censorship and moderation and the potential for social media to impact young people's offline perspectives. Videos of Tate have been viewed more than 12.6 billion times.[79] Tate is a former kickboxer and reality TV show contestant who operated an online business that acted as a 'university' at its peak and had 127,000 members paying £39 a month to access the site.[80] He is currently based in Romania, having moved from the UK, stating that he made this move partly due to the criminal justice system, "I'm not a rapist, but I like the idea of just being able to do what I want. I like being free."[80] He was charged with rape and human trafficking in Romania in 2023.[81] His content is aimed at young men, and broadly styled as self-help or motivational content. However, he consistently espouses views that are misogynistic and demeaning of women. While some of his content is broadly outside the mainstream, he has a large online following of young men.[80,82,83] Social media platforms have taken some steps to moderate his content, with his accounts banned on TikTok, YouTube, Instagram, Facebook, and X (formerly Twitter) but recently reinstated his account. But despite his accounts being banned, videos of Tate still appear on all these platforms, with other accounts posting his content.[84] In New Zealand, there has been anecdotal evidence from teachers that many young men are watching Andrew Tate, and that the videos are influencing their views offline.[83] The moderation technique employed by social media platforms for Andrew Tate was to ban his accounts, but some of the content itself is still appearing on the platforms. Instagram, YouTube, and TikTok's algorithms have allowed his content, reaching many young people. Some of the content goes against their community guidelines but, despite this, hasn't been moderated. This highlights that there varying degrees of transparency on different platforms about what is and isn't moderated.[85]

Social media has amplified challenges, many that have always been around

The social media environment has amplified many challenges that young people face as well as issues that wider society has grappled with for a long time. Many of these challenges have been exacerbated by the online environment but not created by it. For example, the impact of polluted information on mental health, foreign interference, and radicalisation are not new phenomena. Polluted information can be created and disseminated without the online environment and in recent cases in New Zealand a lack of internet and ability to stay connected with the news actively fuelled polluted information.[86] Recent studies using data from Facebook and Instagram show that confirmation bias, engrained personal beliefs, and patterns of engagement may override moderation and changes to algorithms, increasing the need to consider the educational changes needed (as outlined in Sections 4, 5, and 6) rather than relying on regulation.[87] The internet and social media have undoubtedly extended the reach of these challenges, and in many cases increased their complexity and severity.

These challenges are wide-ranging and interconnected and show the influence social media has on many facets of young people's personal and collective lives. They are elaborated in Annex 3 and summarised below:

- Social media has made finding community much easier, which is positive for marginalised groups but also means that those who hold extremist or fringe views can find one another.
- Foreign interference during democratic elections and more broadly to undermine democratic institutions can occur readily through social media, with the ability to harness bots and troll farms to push divisive content, see Case study 2.
- Polluted information that is hard to identify as being inaccurate, false, or misleading. Social media has afforded a platform and mechanism for polluted information to be spread and move into the mainstream, see Case study 3 for an example.
- Radicalisation and extremism can occur more easily online, with social media platforms, including fringe ones, allowing extreme views to proliferate and groups who coalesce around similar world views and perspectives to form.
- Child safety is vitally important, with increased risk of grooming and child exploitation online including on social media sites, forums, and streaming.
- Data sovereignty, which broadly refers to the right to determine what happens to your data in both an individual and collective sense, is challenged by social media platforms. Social media has seen a significant rise in the volume of data collected and used, sometimes without users' knowledge.
- Privacy refers to the right to have time out of the public sphere. Social media and the wider online environment have drastically imposed on our ability to exercise this right, and in New Zealand there is no right to be forgotten unlike some jurisdictions.
- Young people are navigating intimate relationships online, with challenges including sexting and image based abuse which highlight the importance of young people understanding digital consent and digital ethics.
- Many young people face bullying, especially members of marginalised groups who experience this disproportionately. Social media means that young people can't leave their bullies at the school gates.

- Body image impacts many young people, with social media amplifying the comparison people make between themselves and idealised bodies.
- Young people's mental health has seen a decline concurrently with an increase in social media use, although studies struggle to show causation.
- Many young people are experiencing racism online and rangatahi Māori contend with additional discrimination in the form of anti-Tiriti sentiment.
- A majority of young people are accessing pornography online, raising the risk of the often-unrealistic depiction of sex and relationships impacting their offline behaviour and/or attitudes.

Many young people face bullying, especially members of marginalised groups who experience this disproportionately. Social media means that young people can't leave their bullies at the school gates.

Young people are facing these challenges on social media and in the online environment, making their lives increasingly complex. If fears about these challenges prevent or discourage teachers and schools from teaching students about social media opportunities and risks, then the risks may be increased, especially for young people whose parents and caregivers have a lower level of digital literacy. If education aspires to be a space where the mana of all young people is upheld, there is an urgent need to develop a whole of school community response, supported by government policy, to increasing media and information literacy and digital citizenship skills, competence, and confidence of young people.

Case study 2: The 2016 US election – division and foreign interference

Foreign interference which utilises social media is continuing to occur, and it is important to consider whether young people in New Zealand are aware that it can occur here. During the 2016 US election, there is substantively documented evidence from government and non-government sources that foreign interference occurred, with a strategy to promote division and call into question democratic institutions.[88] The interference was two-fold. There was a clear preference of the foreign entity for one of the candidates in the presidential election and a broader goal of undermining trust in the electoral system itself.[88] State-sponsored Twitter accounts operated during the 2016 election, sharing polluted information and seeking to stoke division.[89] Although there is some debate about the extent to which state-sponsored trolls influenced the election,[90] there is evidence that foreign interference occurs within democratic elections.[89,91]

The foreign interference campaign happened in the broader landscape of declining trust in democratic institutions and increasing division.[88] The second objective of undermining trust has arguably been more successful than altering an election's outcome. The technique used by a foreign entity is not new and reflective of information warfare that occurred throughout the 21st century.[92] Social media has allowed information warfare and foreign interference to occur at a large scale with minimal cost.[92]

Case study 3: Spit-gate – how a video and made up story went viral

At a film premiere in Venice in 2022, a video with two A-List Hollywood celebrities, Chris Pine and Harry Styles, went viral. It's a short clip with Pine seated clapping Styles' entrance; Styles comes and takes his seat, slightly pursing his lips, at which point Pine looks into his lap and stops clapping.[93] The video is poured over by fans convinced that Styles spat on Pine, using this ambiguous video as definitive proof that the two hate each other.[93,94] They make video clips explaining what they believe the situation is, and it goes viral, ending up all across social media platforms and in mainstream media, including in prominent New Zealand media.[93-95] Pine's and Styles' representatives released a statement saying the incident didn't occur.[96,97] But this doesn't do anything to stop the quell of speculation about why it happened and the drama that led to 'spit-gate'. Although a relatively light-hearted example, spit-gate shows the alarming rate at which unverified and refuted evidence spreads on social media and that official sources clarifying information don't stop the spread. When the information spread is about vaccinations or election legitimacy rather than the actions of two celebrities, there can be substantial offline consequences.

1.13 Young people, parents, caregivers, whānau, and teachers are ill-equipped to keep up with media and information literacy and digital citizenship knowledge and skills

Young people

Research from the US highlights that young people's capabilities to reason effectively, navigate sources of information confidently, and engage critically with knowledge across diverse content areas, are not assessed consistently and thoroughly across primary and high school, nor at the university level.[98] Access to information online, online communities, and social media, markedly increase the potential for polluted information, manipulation, and prejudice to be experienced by young people. However, the education system is not providing adequate opportunities for young people to acquire the critical skills needed to navigate this complex environment.[98,99]

… the education system is not providing adequate opportunities for young people to acquire the critical skills needed to navigate this complex environment.

An international study of online civic reasoning, covering 21 education systems globally (but not New Zealand), found that fewer than 10% of high school young people (year 9 to year 13) could successfully judge whether a website was a reliable source of information by using multiple sources to verify a claim. The International Computer Information Literacy Study (ICILS) (2018), found only 2% of 13-14 year olds were able to critique online information.[100] The study included data from a test of young people's computer and information literacy capability.[100] Additionally, a study in the US of 3,446 high school students found that 96% of young people didn't identify that a site claiming to disseminate factual reports on climate science had ties to the fossil fuel industry.[98] Other evidence suggests that positive digital citizenship skills, such as young people being able to collaboratively reason with others online, to empathise with others' needs, and understand the impact of one's social media usage on others, or to regulate emotions and online behaviour well, are all at relatively

low levels.[101] Our high national rates of cyberbullying are also indicative that young people's digital citizenship skills are low in New Zealand.[44]

Our high national rates of cyberbullying are indicative that young people's digital citizenship skills are low.

Parents, caregivers, and whānau

If parents, caregivers, and whānau are to support young people in the online environment, they need understanding and skills to navigate the environment themselves. Broadly, parents, caregivers, and whānau want to ensure young people have the opportunities that the online environment presents, while reducing any harm that may occur.[102] Many parents, caregivers, and whānau in New Zealand are already using some techniques to support young people, including talking about what they are doing online, setting rules for how much time young people can spend online, and blocking or filtering websites.[102] Research by Pew Research Center, conducted in 2020 in the US, found that 67% of parents say parenting is harder today than 20 years ago.[103] Parents identify the online environment as a key concern for their parenting, with 71% of parents saying they were somewhat concerned their child spends too much time on screens. In the research by Pew and a report in Australia, parents have concerns about the harm that phones, social media, and the internet might have on young people, with specific concerns around data privacy, young people encountering inappropriate content, advertising, and what types of content young people see via algorithms.[103,104]

There are strategies that parents might use to promote skills that draw on methods identified for non-digital activities. Studies of parental mediation of the potential negative effects of media and new digital tools identify four strategies: active mediation in the form of talking about content; restrictive mediation through setting rules and limits; co-viewing (parallel use); and participatory learning that involves interacting together with and through digital media.[105] The strategies that limit access and use are more often associated with parents with fewer skills with digital technology, while those that are more enabling of skills are more likely to be adopted by parents who are more digitally skilled.[106]

Variable use of these strategies has been found. In the UK, Ofcom's tracking of media and information literacy shows that nearly all parents of school aged young people mediate their young person's use of the internet in some way, either through technical tools, supervision, rules or talking to their young person about staying safe.[107] More than a third of parents use all four of these approaches. Ofcom also reported in 2020 an increase in parents reporting that controlling screen time has become harder. This may be related to age associated changes in use of the internet, with up to a third of people younger than 13 years reportedly using social media in European studies.[107]

Research on preschoolers through to adolescents shows that parents generally worry about negative effects of the internet and social media on social and emotional skills, particularly on social isolation and the addictive properties of some content.[105,106] The evidence also suggests that more positive effects are perceived by parents with higher education levels, who are more familiar with the internet and have young people who are older, but that concerns may be increasing even for these older children and adolescents as the social media platforms change and access increases.[106] A study of Chinese parental beliefs around their child's use of the internet found variability based on the

parent's socioeconomic status (SES).[108] Specifically, high SES parents were more likely to encourage young people's use of the internet in comparison to parents of low SES. This was attributed to the likelihood of high SES parents having more knowledge of the internet and its potential benefits, as well as having higher levels of education.[108] A study of Latina mothers and fathers in the US also found educational and SES differences. Parents who graduated high school or beyond stressed the importance of co-using devices with young people, and low-income parents, with diverse educational levels, expressed the importance of continuously monitoring device use to avoid the risks of inappropriate content.[109]

Research on preschoolers through to adolescents shows that parents generally worry about negative effects of the internet and social media on social and emotional skills, particularly on social isolation and the addictive properties of some content.

Despite parental concerns about the internet increasing, parents and caregivers in some cases are becoming less likely to moderate their young person's activities, although European studies have suggested surveillance and restrictive controls may be of increasing concern for middle class families.[106] With widespread access, adolescents now report feeling bad and upset when access is taken away, for example through parental surveillance and control.[42,106] Intensive studies of parenting with preschool children also indicate multiple strategies are used to promote effective use of devices. It is not known what range and types of strategies parents use in New Zealand, but the strategy of restricting access to the internet is not seen as helpful by a majority of adolescents who have been surveyed, and fewer than half identify parental monitoring as a helpful protective measure, which may mean low rates of success for this strategy.[42] Despite research showing that parents, caregivers, and whānau want to support young people online, many are not equipped with the knowledge or skills to do so.[110] Parents, caregivers, and whānau need support, skills, and knowledge to help their young people.

Despite research showing that parents, caregivers, and whānau want to support young people online, many are not equipped with the knowledge or skills to do so.

Teachers

This report focuses primarily on what we can do through the New Zealand education system to equip young people with media and information literacy and digital citizenship; a key part of this is ensuring that teachers are equipped with the skills and knowledge to teach their young people in these areas. ITE programmes are designed to develop deep understanding of Ngā Matatika | the Code and Ngā Paerewa | Standards, and so emphasise supporting and developing critical analysis skills as preparation for the demands of teaching. ITE programmes have the flexibility to adapt content to reflect current priorities/issues. We heard that in New Zealand and around the world, the teaching workforce's knowledge has gaps, with initial teacher education (ITE) currently not comprehensively covering pedagogy for media and information literacy and digital skills, and a lack of fit for purpose PLD occurring for established teachers.

As well as a lack of media and information literacy and digital literacies embedded in ITE programmes,[111,112] there are not consistent opportunities to upskill in this area once in the workforce: professional learning development (PLD) is relatively ad-hoc and varies from school to school in other countries,[113] as well as in New Zealand (see Annex 4), even though digital fluency is currently a national priority for regionally allocated PLD.

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The lack of teacher education is associated with a low self perception of teachers' broad digital skills. Evidence from Spain shows that the digital skill level of teachers is broadly the same as the general population.[114] Research into the barriers to teaching critical thinking to teachers, a concept central to media and information literacy, outlined two key barriers: not having a background understanding of critical thinking; and not knowing how to teach critical thinking.[115] Teachers need to be equipped during ITE and have ongoing opportunities to upskill, which is currently not the case.[113,115,116] We acknowledge that teachers are currently facing many challenges and a changing curriculum, and that there is a need to carefully consider how to support their media and information literacy and digital citizenship skills without adding to these challenges.

1.14 Artificial intelligence

AI is rapidly becoming a central part of public discourse and increasingly being used in many aspects of life. It offers significant opportunities to improve productivity and wellbeing, but also poses potential risks, including for young people. As an example of how quickly technology relevant to polluted information is developing, during the course of writing this report we have witnessed the sudden emergence of ChatGPT and related LLMs as widely available tools. Significant concerns had been expressed ahead of this development. For example, the company Open AI had previously decided not to release ChatGPTG-2 to the public "due to our concerns about malicious applications of the technology" including the "potential for misleading news articles, online impersonation, and automating the production of abusive or faked social media content and of spam and phishing content."[117] With ChatGPT-4, Bard, and other AI tools now well and truly available, we are watching the impact on our polluted information landscape in real time.

The technology is developing very quickly. ChatGPT reached 100 million users faster than any platform in history.[118] Embedding automated access to LLMs from other programmes and using the response to undertake further actions (in applications such as AutoGPT[119]) allows the AI to accomplish a wide variety of digital tasks in a very human-like manner and limits opportunities to opt out. Open access code for LLMs is becoming available so people can generate their own and train them on whatever (polluted or otherwise) data sets they choose, without the self-imposed controls of the large corporates. Young people need to be equipped with the skills to both harness opportunities and be aware of AI's limitations and risks. Media and information literacy and digital citizenship are undoubtedly an important part of their tool kit.

AI is also rapidly changing and being integrated into social media platforms, in front-facing and more explicit ways. Snapchat has My AI available to all their users as a chatbot. Snapchat itself has acknowledged the potential for polluted information to be shared and, on their website explaining My AI, highlights that young people should be checking whether the answers are factual.[120] There have been concerns raised by parents, caregivers, whānau, and young people about the chatbot and the content that it is producing, even with guidelines in place, including content that is explicit to minors, inappropriate content about mental health, and growing concerns about privacy.[121] The trend of AI being integrated into platforms in this manner will likely continue. AI acts as a force multiplier for polluted information, increasing both the amount of content created and the dissemination of this content.[122] MoE has provided some initial guidance on the use of generative AI for schools on its website,[123] and more guidance is urgently needed.

1.15 Current New Zealand regulatory environment

Every new technology since the printing press has posed challenges for regulators, because content can be created and disseminated faster than regulations can be put in place.[20] These challenges are magnifying in the age of the internet, and especially with the exponential production of content by AI. It is unlikely that regulation will solve the challenge of polluted information in this environment, but it may have a role to play. This section gives a brief overview of the current legislative and regulatory environment in New Zealand to provide context for these challenges.

Overall, in New Zealand, regulatory oversight is minimal, with some adjacent legislation that covers aspects of polluted information, see Table 3, but nothing which directly seeks to limit or regulate it. The Films, Videos and Publications Classification Act 1993 is what gives Te Mana Whakaatu The Classification Office the authority to classify content, including that found online.[124] This helps with objectionable content, like the Christchurch terror attack video, making the content illegal to hold and distribute. But cases of censorship happening online generally have a high threshold with a process for this classification to occur, meaning that this Act doesn't protect from most polluted information.

The Harmful Digital Communications Act 2015 (HDCA) was introduced to help people dealing with serious or repeated harmful digital communications.[125] As part of this, it lays out ten communication principles to guide online communication, as outlined in Annex 5. Netsafe has the responsibility to help resolve reports that breach the principles, with issues not resolved by them potentially taken to the District Court. The affected person, or others as specified in the HDCA, or the police if the communication constitutes a threat to safety, can bring forward the proceedings. The District Court can order the content to be taken down, post cease and desist orders, order a correction, apology or right of reply, protect or reveal the identity of the person behind anonymous communication, and give name suppression to people.

The Defamation Act 1992, is an older piece of legislation which is focussed mainly on the balance between freedom of expression and protection of reputation damage, with a larger focus on traditional media rather than social media.[126]

While each of these acts has important aspects to help make the online environment safer or build young people's resilience to it, there are gaps in the legislation. There is also a disconnect between the time it takes to publish and share content and the processes required to regulate the content, with material able to be shared widely before regulators can act. Social media companies are not

currently regulated in New Zealand, although this is under discussion (see Section 1.16), leaving processes to address polluted information occurring voluntarily by organisations themselves.

There is a disconnect between the time it takes to publish and share content and the processes required to regulate the content, with material able to be shared widely before regulators can act.

Table 3: The current regulatory environment in New Zealand.

Legislation	Purpose in relation to young people's resilience
Films, Videos and Publications Classification Act 1993	Provides mandate and guidelines for process of classification, and penalties for those who breach the Act, gives power to Te Mana Whakaatu The Classification Office and the Chief Censor.[124] • Part 7A outlines the take-down notices for objectionable online publications.[124]
HDCA 2015	Sets out the law and court proceedings for harmful digital communications. The law defines the term harmful digital communications, including online bullying and threats with a specific provision of intimate visual recordings without consent. It also outlines the orders that the court can make for those breaching the law.[125]
Defamation Act 1992	Defamation law balances freedom of expression and the protection of reputation from untrue statements. This law identifies what is categorised as defamation and the steps that occur if something is considered defamatory. Defamation cases have usually occurred regarding material in media publications.[126]

New Zealand is one of the first countries signed up to the Christchurch Call. The call was formed in 2019 as a response to the Christchurch Mosque shootings where 51 people were killed and dozens more injured, and seeks to put together a series of voluntary commitments between governments, tech companies and civil society with the common goal of eliminating terrorist and violent extremist content online.[127] The call was led by former Prime Minister Jacinda Ardern, and New Zealand sits on a number of bodies within the Christchurch Call, while also seeking to uphold our commitments to it.[127]

In 2022, Meta, Google, TikTok, Amazon, and Twitter voluntarily signed a code of practice for online safety and harm. The Aotearoa New Zealand Code of Practice for Online Safety and Harms was formed by the industry with consultation occurring with Netsafe and community groups.[128] The code seeks to reduce online harm but has garnered some discussion about how the industry is seeking to pre-empt regulation by the government, which would potentially be stricter and more robust. The agreement is also voluntary, and internally monitored, making it difficult to keep social media companies accountable for breaches of the agreement.[129] Other countries internationally have moved to regulate social media companies with more rigour, and there is an opportunity for that to occur in New Zealand.

1.16 What are government agencies doing?

Beyond the work taking place in schools around New Zealand, there is work occurring across government that seeks to address aspects of, or issues adjacent to, this report; some of this work is outlined below.

Te Mana Whakaatu The Classification Office

Te Mana Whakaatu The Classification Office has conducted research into areas relevant to polluted information and the broader online environment. The office released a report 'The Edge of the Infodemic' focused on misinformation and disinformation in New Zealand[130] as well as research on pornography and the impact on young people in a series of reports.[131-133] Case study 4 highlights the Youth Advisory Panel of Te Mana Whakaatu The Classification Office.

Department of Prime Minister and Cabinet

Department of the Prime Minister and Cabinet (DPMC) has a coordinating role to support a whole of society approach to polluted information.* They govern a civil society led group to scope longer term work, support capacity building and community resilience through a one off fund, and commission public research and analysis into the problem.[7] An annual hui which aims to bring people together to build relationships and understanding of violent extremism and terrorism is hosted by DPMC in partnership with He Whenua Taurikura, the independent national centre of research excellence focused on preventing and countering violent extremism.[134]

Department of Internal Affairs

The Department of Internal Affairs (DIA) produced a website and associated campaign in 2020 called 'Keep it real online'.[135] The website provides resources for parents, educators, and young people that address different topics from polluted information, to porn, to bullying, and gaming.[135] The campaign, particularly a video addressing pornography, was shared widely both within New Zealand and overseas.[136] The DIA also released a report proposing a potential approach to regulating platforms,[137] and has safer online services and media platforms consultation and policy review underway .The National Library, part of DIA, also funded School Libraries Association of New Zealand Aotearoa (SLANZA) to partner with Tohatoha to deliver the 'A Bit Sus' pilot PLD to school librarians in 2021/22 (see Case study 12).

Mental Health and Wellbeing Commission

The Mental Health and Wellbeing Commission have produced an insights report into the wellbeing of rangatahi Māori and other young people in New Zealand, that highlighted the importance of social media in young people's lives, with significant opportunities but also potential harm. One key finding of the report was that connection to whānau and culture offered cultural resilience and improved the wellbeing of young people.[138]

*They term it disinformation.

Netsafe

Netsafe has the contract through the MoE to provide information and support to schools around online safety, bullying and abuse, how to manage online incidents, and guidance on how to manage digital citizenship. Netsafe has also produced some resources for educators around polluted information, which they term fake news, and digital citizenship. These have included producing six 'micro learning moments' that cover topics associated with the online environment.[139,140] They have produced some content with Meta, including a short eight question quiz about misinformation online that could be included in a lesson about identifying fake news.[141] Their larger focus is on risk reduction and incident management, and they are not resourced to produce extensive support materials for media and information literacy and digital citizenship.

Education Agencies

The MoE, together with Tertiary Education Commission (TEC) and the New Zealand Qualifications Authority (NZQA), has recently released Connected Ako: digital and data for learning – a strategy for education agencies.[142] It builds from wider government strategies and identifies six areas of work for education from which actions are derived:

- Incorporating te ao Māori in digital design – agree processes to embed te ao Māori in digital design and delivery.
- Using data to make a difference – design digital identity and deliver a sector data framework.
- Safe and effective digital services – improve digital services and support for schools and kura and cybersecurity assurance across all education organisations.
- Engaging widely and effectively – work with diverse stakeholders on building inclusive digital approaches.
- Future focussed leadership – collaborate to scan, plan, and trial emerging technologies.
- Transformed learning, teaching, assessment, and research – build the commitment to include digital and data considerations throughout the education journey.

Case study 4: Te Mana Whakaatu The Classification Office Youth Advisory Panel

This report is focused on young people, and it was important for the authors to meet with and listen to the youth voice, ensuring their perspectives and understandings were reflected in the report. This case study reflects the insights of Te Mana Whakaatu The Classification Office Youth Advisory Panel (YAP), a group of young people in high school and university, who gave us valuable insights into their perspective and experiences of polluted information online and what would help within the education system to address it. The themes and ideas are captured in this case study. All the young people expressed concern about polluted information and acknowledged that it was having an impact on their peers and those around them. Some felt that they weren't susceptible to polluted information, while others felt that they were. The questions and reflections of the YAP are outlined in Table 4.

Table 4: Questions and reflections from the YAP.

Who do you trust online?

- Verified news sites (Stuff, BBC, Vice News etc).
- Influencers who reference or cite their sources.
- Fitness influencers.
- David Attenborough.
- Te reo Māori & cultural media outlets.

What spaces do you experience polluted information on?

- Snapchat.
- TikTok.
- Twitter.
- Instagram.
- Facebook.
- Online forums/gaming.

The panel identified ways to discuss polluted information with young people:

- Open dialogue rather than “shoving it down throats”.
- Needs to be taught multiple times across schooling, not just a single lesson or once a year.
- Discussions should start young.

What precautions are you taking online to avoid misinformation and disinformation?

- Unfollowing pages and people who are sharing misinformation.
- Watching documentaries to learn factual information.
- Fact checking by looking at other sources.
- Research counter arguments to misinformation encountered online.

What types of mis/disinformation are you experiencing online?

- Body/health related misinformation.
- Deepfakes.
- Social issues.
- Celebrity fake news.
- Statistics being misused.
- Mental health.

How do you establish whether something is accurate or not?

- If it’s “a bit sus”, discuss with friends.
- Talk with parents for their perspective.
- Factchecking websites.
- Checking verified news sites to see if they are reporting on the issue.

The YAP discussed the concerns they have for their digital and online safety, with particular concern about scams, whether school public Wi-Fi is safe, what is happening to their personal information, whether they are given privacy online, and hackers. They also raised concerns about how they and other young people were being shaped by the online environment and the risks that highly personalised feeds and search results driven by AI and algorithms presented. These included the concern that they were living in an echo chamber, missing out on differing views, and that they were not having their opinions challenged. They also raised a concern about social media addiction being driven by algorithms and AI.

The YAP expressed significant interest and reflection about the online environment, social media, and how it shapes their lives. They identified that education about social media and the online environment is important for young people and should be included in school. But currently the information is mostly negative and "shoved down young people’s throats". This is perceived as

unhelpful for young people and causes disengagement. There needs to be room for discussion without judgement.

There needs to be room for discussion without judgement.

The panel also identified the content that should be included when teaching young people media and information literacy skills. These were wide ranging but included: how to check sources and question the intent of sources; the importance of common sense; new and emerging issues; the potential consequences of sharing information in an online post; what things shape the online environment including algorithms; AI and targeted advertising; and the difference between fact and opinion.

Many young people are highly informed, digitally savvy, and generally aware of the challenges involved in negotiating online spaces and information safely. It is clear that any potential education intervention or media and information literacy and digital citizenship approach must be designed by, with, and alongside young people themselves given their familiarity with these spaces and the specific challenges they face and understand.

1.17 This report focuses on education

Young people are facing a complex online environment, with which they are spending more time engaging. Education has significant potential to equip young people with greater skills, knowledge and understanding of the wider world. Education is a tool to equip young people with critical thinking skills and develop pluralistic views, but one which has to be intentionally and carefully enabled.[143] While much of the online environment has risks, there are many opportunities, and there has never been a time before when young people have had so much at their fingertips. A vital element for success is ensuring young people have the skills to utilise all the online environment has to offer, while having the knowledge, dispositions and skills needed to navigate the risks. The learning ecosystem needs to develop muscle memory to respond to polluted information as needed, with a robust response to polluted information that equips young people to be part of a hopeful future enabled by education.[144]

A vital element for success is ensuring young people have the skills to utilise all the online environment has to offer, while having the knowledge, dispositions and skills needed to navigate the risks.

Context key takeaways:

- Young people are navigating an increasingly complex online environment.
- Polluted information is an increasing feature of our world.
- Enhancing young people's resilience to polluted information through media and information literacy and digital citizenship will equip them with tools to maximise the benefits and minimise the harms of this environment.
- We frame resilience as a collective concept, acknowledging that community connection and networks provide strength and mana to navigate online challenges.

2. International comparisons

The countries which have been selected for international comparison are the top five countries in the Media Literacy Index 2022, these being Finland, Norway, Denmark, Estonia, and Sweden.[145] Measuring media and information literacy is challenging and the index assesses the resilience the country has to fake news, using the somewhat distant proxy indicators of media freedom, education and trust in people.[146] The index assesses 41 European countries and those that score best are generally the Nordic countries, which have had relative success implementing media and information literacy and digital citizenship into the curriculum at a national level.

Country comparisons of these Nordic countries are provided in Annex 6 highlighting the following aspects:

- The Media Literacy Index 2022: this index is based in Europe and assesses the resilience of countries to fake news.[145] This is used as an indicator of the country's strength in promoting media and information literacy. The proxy measures to calculate the rankings, are specifically: freedom of the press (using the Freedom House and Reporters without Borders indexes); PISA indicators (with reading literacy given the highest weighting in the rankings); and two measures for trust in people and institutions, the e-participation Index and Trust in others World Values Survey). These measures act as proxies for the general population, not just young people, and we need to look beyond these proxy measures when considering the New Zealand context.
- The PISA reading literacy ranking of the countries: PISA tests in each country, then scores each country based on these tests, and is used as one indicator for the outcomes of each country's education system. The average reading literacy score in the OECD in 2018 was 487, with higher scores equating to stronger test results.[147,148] There are other measures including mathematics literacy and science literacy.
- National strategy(ies): this refers to a country's national education strategy or strategies referencing media and information literacy and digital citizenship, or related concepts. These highlight whether media and information literacy is on the national agenda, supported by the government, and part of strategic planning in education.
- Curriculum: whether or not critical thinking and digital citizenship are included within the curriculum of each country, indicates the government's priority and focus on media and information literacy and digital citizenship.

Countries that are seen as most successful in media and information literacy and digital citizenship have embedded these skills as competencies or learning areas in their curriculum and have national strategies helping to guide their implementation (see Case study 5 for an example). New Zealand does not have a national strategy focused on integrating media and information literacy and digital citizenship in the curriculum. However, as part of the curriculum refresh, the recent Literacy & Communication and Maths Strategy does call for digital literacy as part of literacy to be in all learning areas.[149] The strategy recognises the importance of digital literacy that includes the operational skills to retrieve and understand information on the internet, and create and share quality content online. These skills are essential to enable young people to act as critically engaged citizens, as they continue to develop their knowledge and understanding of media and information literacy and digital citizenship.

Countries that are seen as most successful in media and information literacy and digital citizenship have embedded these skills as competencies or learning areas in their curriculum and have national strategies helping to guide their implementation.

Digital citizenship is not yet explicitly embedded in the curriculum in New Zealand, although aspects are included in Digital technologies | Hangarau matihiko (see Section 4),and there are some resources on Netsafe,[150] and on the e-learning section of the MoE website.[151] Many individual schools operate digital citizenship programmes or have young people sign digital citizenship contracts; many of these have a primary focus on online safety.[152] This report may support the embedding of these skills into the curriculum and development of national policy and strategy to guide implementation across the education system.

To draw relevant lessons from the international case studies, we focus on how these programmes, policies, curricula, and strategies could align with the New Zealand context. This includes honouring Te Tiriti and ensuring that these skills are learned in the context of our unique multicultural frame to cater for the diversity seen across the ELS, schools, and kura in New Zealand.

Case study 5: Norway teaching teachers for the digital age

Norway has a professional digital competence framework for teachers which was introduced in 2017, in part as an acknowledgement that teachers first need to be equipped with digital skills and understanding before they can teach young people. The framework aims to establish a common conceptual framework and a reference for teachers' digital competence.[153] The framework is based on the basic skills framework, each with a digital focus, which has seven competence areas:

- Subjects and basic skills: teachers should understand digital developments, how to integrate digital resources in learning processes and develop their own digital skills.[153]
- School in society: teachers are familiar with perspectives of digital developments and the role of digital media. They have the knowledge to help all young people to become active participants in the global and digital society, including the ability to participate in tomorrow's labour market.[153]
- Ethics: teachers have insight into legislation, ethical concerns, and the development of young people's learning about participation in a democracy. The teacher supports young people to develop digital judgement.[153]
- Pedagogy and subject didactics: teachers have knowledge about digital pedagogy, integrating digital resources across their teaching to foster young people's learning.
- Leadership of learning processes: teachers can guide learning in a digital environment, including understanding the changes occurring and using diverse forms of assessment.[153]
- Interaction and communication: teachers use digital communication channels for information, collaboration, knowledge sharing, building trust, and encouraging participation.[153]
- Change and development: teachers are aware that the development of digital competence is lifelong and dynamic. Teachers continually improve their knowledge and practices based on research and development. Teachers drive their growth and contribute to a teaching culture of continual digital learning.[153]

Norway acknowledges that in order for teachers to adequately teach young people the skills for a digital age, they first need a framework, support, and tools.

2.1 Country analysis Finland: a systematic approach to media and information literacy and digital citizenship

Finland was chosen as an extended country analysis to highlight in this report due to their relative success in building young people's media and information literacy and digital citizenship skills. This country analysis explores what Finland is doing successfully, where there are gaps, and where and how New Zealand can learn from its strategy. According to the KAVI - The Finnish Media Education Authority website: "In media literacy, the ability to read and write is extended from traditional texts to different kinds of media texts. In addition to traditional written text, media texts and content can also consist of images, videos, sound, or a combination of these. As media devices have improved and the number of different methods of publishing have increased, the boundary between media user and media producer has started to disappear. This is why media literacy also includes production skills and competence. Media literacy can also be seen to include skills relating to media use, information retrieval, critical reading, communication and interaction, inclusion, influencing and life management. As well as media skills, media literacy also includes knowledge of different kinds of media phenomena. Both perspectives complement and support each other. Media literacy also has a strong cultural dimension."[154]

A key part of Finland's success is acknowledging that the education system is responsible for equipping young people with media and information literacy and digital citizenship skills to navigate the online environment. In Finland, multiple strategies traverse the government, and there is a coordinated, although at times not fully cohesive, effort to equip the population with media and information literacy and digital citizenship, including the ability to combat polluted information. There are gaps, with one particular area of concern being the lack of data, awareness, or acknowledgment of particular needs of the indigenous Sámi population. There are mounting reports and evidence that immigrants to Finland are falling behind those born in Finland.[155,156] Resources addressing media and information literacy and digital citizenship are not tailored or adapted to be relevant to different minority groups.

A key part of Finland's success is acknowledging that the education system is responsible for equipping young people … to navigate the online environment. In *Finland, multiple strategies traverse the government, and there is a coordinated, although at times not fully cohesive, effort to equip the population with media and information literacy including the ability to combat polluted information.*

Finland has a robust education system

The strong media and information literacy focus occurs in the context of a generally successful education system. PISA data shows that Finland has consistently high scores with an overall ranking across reading, writing, maths, and science of 11th in the OECD countries.[148] However, Finland's scores in PISA have steadily declined since 2000 across reading, mathematics, and science.[148,157]

Research into the 2018 PISA scores showed immigrant young people performing below their non-immigrant peers in reading, even when socioeconomic position was accounted for.[157] The PISA scores mirror New Zealand's PISA scores, which are relatively high but declining.[147,148] The reasons for this are not agreed upon and will likely be different in New Zealand and Finland.

A different way of thinking about education

There are two major schools of thought in Western curricula, one coming from the Anglo-American curriculum and the other from the German-Scandinavian Bildung/Didatik. The Bildung Model has its roots in the concept of education forming an autonomous, self determined, and self aware person.[158] In this system, teachers have a high degree of autonomy in delivering the curriculum, allowing young people to learn in the subject areas and giving young people the skills and thought needed as a person, not just as a student or employees.[158] Young people and teachers can challenge the curriculum, and there is an understanding that it must be flexible with the ability to adapt and change.[158] The Anglo-American curriculum has a broad focus on preparing young people for the workforce, with emphasis traditionally being on standardisation and testing.[158] The teacher's task is not to interpret but to implement the curriculum. The Finnish curriculum has historically been a mixture of both these traditions. In 1970, Finland made substantive educational changes, creating a uniform, comprehensive school system with basic education from grades 1-9 and a curriculum that is reviewed approximately every 10 years. But ideas from the Bildung Model have continued as an important part of education in Finland (and the other Nordic countries) and helped create a curriculum focused on forming individuals, not merely measurement and assessment.[158]

Libraries partner with schools

Public libraries form another vital part of media and information literacy in Finland, supporting schools and young people. Libraries are a public good in Finland, and are utilised by a wide cross-section of society. Supporting teachers and delivering programmes in schools is part of their mandate under the Libraries Act.[159]

Schools generally don't have their own library, meaning that collaboration must occur between schools and public libraries. Librarians are experts in information seeking, and have understanding of how to critically engage with texts.

Schools and libraries have a partnership which includes the design of local curricula, and libraries run programmes to help schools deliver the curriculum.[160] Schools generally don't have their own library, meaning that collaboration must occur between schools and public libraries.[161] Librarians are experts in information seeking, and have understanding of how to critically engage with texts, much of the workforce is trained, with public libraries having to report the qualifications of their workforce to their municipality.[162,163] Some libraries, tasked by their municipality, promote media and information literacy by offering workshops and lessons for schools at no cost, seeking to upskill teachers and equip young people with these skills.[163] While partnership between schools and libraries currently occurs, there is potential for more, with the expert knowledge of librarians and the pedagogy of teachers combining to form a strong base for teaching media and information literacy.[161,162]

An example of the library school partnership: Lahti library

The library in the city of Lahti, Finland supports community members, schools, teachers, and young people with media and information literacy. The library offers a service to teachers and schools to run media and information literacy programmes in classes, these are free of charge and part of the wider relationship between schools and libraries.[164]

The library runs different activities that address topics of media and information literacy for young people who visit. One example is that during the national elections in 2023, the library ran a fairytale election alongside this process with different characters vying to become the library's mascot. The different characters had campaigns that included social media posts, press releases and articles about speeches they had given. Young people were encouraged to critically engage with this process, while building their civic understanding of elections. The library is a formal place to vote in the national elections so parents and young people could come together to vote.

Where do Finland and New Zealand sit in the OECD?

Some key education figures in Finland and New Zealand are compared to the OECD average as well as other key country comparators in Table 5. When looking at the percentage of GDP spent on education in 2019, the OECD average is 3.4% with Finland at 3.6% and New Zealand at 3.5%. When looking at the proportion of the education budget spent on teachers' salaries, Finland sits below the OECD average of 67.8% at 55.6%, New Zealand sits at 62.3%. Teacher salaries for lower secondary schools show Finland sitting above the OECD average, while New Zealand sits just below.* Student to teacher ratios in public schools in Finland are just below the OECD average, while New Zealand's sit just above. While across these measures, Finland is spending more and has smaller class sizes, New Zealand and Finland are comparable and close to the OECD averages.

Two areas with substantive differences between Finland and New Zealand are the contact time that teachers spend during a year and professional development that teachers receive.

Two areas with substantive differences between Finland and New Zealand are the contact time that teachers spend during a year and professional development that teachers receive. Contact time refers to the amount of time teachers are spending in the classroom teaching rather than doing administrative tasks. Non-contact time is a vital part of teaching, during which teachers prepare lessons, mark work, and integrate new research and ideas into their teaching. Finnish pupils have short school days, with 190 working days divided into autumn and spring semesters; the school day's lengths are some of the lowest in the world.[165] Finnish teachers have contact time well below the OECD average, a reflection of these shorter school days, and more non-contact time to do the other vital tasks associated with teaching, including upskilling and professional development. New Zealand has contact time well above the OECD average across primary, lower, and upper secondary,[166] meaning that teachers in New Zealand have less time within school hours allocated to the planning and administration associated with teaching.

* Data predates the recent New Zealand salary increases.

Finland has compulsory continuing professional development for their teachers across all year levels; this ongoing training is important, especially in the rapidly changing online and education environments.

Finland has compulsory continuing PLD for their teachers across all year levels; this ongoing education is important, especially in the rapidly changing online and education environments. New Zealand does not have compulsory professional development, with professional development varying across the country, resulting in inconsistency in professional development and teacher proficiency. These differences in the education system are enablers for a focus on media and information literacy and digital citizenship in Finland.

Table 5: Where do New Zealand and Finland fit into the OECD averages and country comparators?

Country	% of GDP on education 2019 (Primary, secondary, and post-secondary non-tertiary)[167]	Teachers' salaries as a proportion of education funding (2019)[167]	Teachers' salaries (USD) Lower secondary schools (2019)[167] *	Teaching staff to student ratio 2020 (primary)[168]	Teaching staff to student ratio 2020 (secondary)[168]	Contact time primary 2021† (hours)[167]	Contact time lower secondary 2021 (hours)[167]	Contact time upper secondary 2021 (hours)[167]	Compulsory continuing professional development 2021 (across all levels)[167]
Finland	3.6%	55.6%	55,660	13	13	680	595	567	Yes
OECD average	3.4%	67.8%	50,026	14	14	784	711	684	N/A
NZ	3.5%	62.3%‡,[169]	49,244	16	15	922	840	760	No
Norway	4.6%	68.6%	54,192	10	10	741	663	523	No, but for primary and lower secondary in individual circumstances
Sweden	3.9%	64.4%	50,620	13	12	N/A	N/A	N/A	Yes, in individual circumstances
Estonia	3.2%	62%	31,620	13	12	592	609	574	Yes
Denmark	3.6%	70.9%	64,255	12	12	699	690	N/A	No

* This refers to the average actual salary that includes work-related payments.
† Contact time refers to the amount of time spent in the classroom teaching rather than administration tasks.
‡ This data was not included in the OECD report, so it was drawn from the statistics on expenditure from the education counts website.

Teachers are highly educated and respected members of the community

Teachers are held in high esteem in Finland and are seen as a core part of Finnish national identity. They are highly educated, with qualified teachers earning Master's degrees.[170] Teaching programmes are highly competitive: only 10% of applicants are accepted.[171]

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While teacher preparation takes slightly different forms depending on the institution, core skills and focus are common across teacher education in Finland:[170]

- A focus on research based teacher education.
- Teachers critically read the research, write essays, and study research methods.
- Even during placement, they will focus on implementing theories and using research in practice.
- The Master's level of study adds to both the prestige and academic focus for teachers, with this level of study allowing for a firm grasp of the curriculum and the curriculum process.
- Teachers have the skills to critically analyse, develop, and adapt throughout their careers; scientific literacy and research are key to their roles.
- Teachers have a level of expectation that they will continue to keep up with the research and developments of teaching best practices.

There is an acknowledgment that teachers need constant upskilling and that evidence based pedagogy should be central to this. The importance of teachers' own digital literacy is underlined as a vital part of professional development, with a strategy of convincing municipalities, principals, and teachers to take the 'digital leap' being in place since the early 2010s.[172]

The importance of teachers' own digital literacy is underlined as a vital part of professional development, with a strategy of convincing municipalities, principals, and teachers to take the 'digital leap' being in place since the early 2010s.

In Finland, there has been an emphasis in the curriculum and government strategies on the importance of digitalisation and a push for new pedagogies that better incorporate digital education.[172] Research, conducted in 2019, into the practices of Finnish teachers use of digital devices show most harness technology on a weekly and, for many, daily basis. Technology is used for a wide range of things in the classroom, including searching for information, accessing online learning materials, emailing, and accessing digital learning environments.[173]

However, teachers' digital skills are not uniform, with differences across demographics and based on personal skill sets rather than school level policies.[173] Multilevel modelling shows that 93% of differences in digital education practice in Finland occurred at the teacher level, with only 7% occurring between schools.[173] This research shows that the level of teachers' own digital skills is a key determinant of their digital teaching practice. One study focussed on teachers' digital skills

showed that digital self efficacy and time in the workforce are the two key predictive factors for digital competency in the classroom.[174] There is also a weak correlation with gender, with evidence suggesting that male teachers both have more access to in-service training and have higher digital self efficacy.[173,174] In-service training was a predictor of digital skills but was largely in line with self efficacy, meaning those accessing in-service training have skills already.[174] Overall, while there has been a significant push for digitalisation and digital pedagogy at a national level, there are still gaps and variance in teaching practice on a teacher level, despite the high level of education and ongoing support.

Finland is building resilience to polluted information through media and information literacy

Media and information literacy programmes in Finnish schools have a solid digital and online focus and an emphasis on identifying polluted information, underpinned by critical thinking. Young people learn about the differences between disinformation and misinformation. Media and information literacy forms a part of civics education in Finland, with many young people studying propaganda campaigns that have occurred, how advertising works, and how statistics can be used to spread polluted information.[175] However, this is not uniform, and there are substantial differences on a school to school and class to class level. Finland has identified media and information literacy as a critical way to make young people more resilient to polluted information campaigns.[175]

KAVI - The Finnish Media Education Authority

Finland is one of a few countries with a governmental media education authority.[176] KAVI has a department of Media Education. The department, the Finnish Media Education Authority, is responsible for promoting media education and young people's media skills and developing a safe media environment for young people.[176] The government body has a legal requirement to promote media literacy, including supporting the education system in implementing media and information literacy across the curriculum.[176] Legislating this responsibility ensures work occurs in this area and that progress is tracked.

The government body has a legal requirement to promote media literacy, including supporting the education system in implementing media and information literacy across the curriculum.

Strategies and policies are implemented at a national level

Finland has policies and strategies implemented nationally and across ministries. These policies and strategies traverse key aspects of the education system and wider government. This high level strategy and implementation, along with having a dedicated Media Education Authority show a government level acknowledgement of media and information literacy. Strategies include the 'Media Literacy in Finland', a 2019 strategy giving guidelines for media and information literacy education, including current strengths and areas for improvement.[12] Media literacy week occurs each year and is run by the Media Education Authority.[177] Finland's Digital Compass sets national targets across government for digital systems and includes the acknowledgement that digital skills are vital for the population.[178] These strategies, alongside their precursors, are outlined in Table 6. By implementing strategies and policies at a national level there is a continued focus on media and information literacy in the face of polluted information.

Table 6: Digital strategies, programmes, and authorities in Finland.

Title	Function	Purpose
The Finnish Media Education Authority (KAVI)	Legal oversight of media literacy and education in Finland.	A subordinate of the Finnish Ministry of Education and Culture, KAVI acts as the finished Media Education Authority, promoting media education and children's media skills while ensuring the media environment is safe for children. They run an educator forum each year as well as an online portal for educators to upskill and access resources in the area of media and information literacy.[12,176]
Productive and inventive Finland: Digital agenda 2011-2020 (2011)	A guiding document for Finland's digital agenda, a precursor to Finland's digital compass.	This sets out a government wide approach to digitalisation. While the focus is broad, throughout there is an acknowledgment that education is key to digitalisation. The precondition "2.3 improving skills and access" has a particular focus on education including highlighting that ICT needs to be an integral part of schooling and teachers' training, and that civic and media skills are integral to the education system. The report outlines the importance of more funding for ICT knowledge and infrastructure within school.[178]
Media Literacy Week (since 2012)	To promote the importance of media and information literacy and education.	An awareness week in February which started in 2012, includes 40 organisations including ministries and large businesses. These partners engage by supporting campaigns, organising events, and spreading material about media and information literacy. The week encourages schools to arrange events locally, as well as facilitating the national campaign.[12,176]
Media Literacy in Finland 2019 (2019)	Policy/Guidelines for Media Literacy.	The media literacy policy gives guidelines for media literacy education; The policy aims to set guidelines for media education and describe the strengths, values, and principles of media education in Finland as well as areas of potential improvement and changes to the media environment.[12] This builds on a 2013 document Good Media Literacy – national policy guidelines.
Digital Finland Framework (2020)	Digital transformation plan for transforming industries.	Focus on digital transformation of industries. Part of framework outlines the importance of digital skill creation in basic education to prepare them with skills needed for the future.[179]
Finland's digital compass (2022)	Sets a national strategic roadmap to 2030, new strategy after productive and inventive Finland: Digital Agenda 2011-2020.	Based on the EU's digital compass. The digital compass sets national targets for digital systems focusing on ensuring Finland's success in the digital world. While this is broader than just education, it has a focus on providing the population with digital skills needed moving forward through the education system.[178]

The curriculum: embedding media and information literacy through transversal competencies

The last curriculum refresh in Finland, the process of evaluating and adapting the curriculum to be reflective of current best practice, was in 2014 and came into effect in 2016. This curriculum has two parts, much like the NZC: one gives the general focus of education across subjects; the other is subject focused.[157] Finland's national curriculum is responsive to opportunities and challenges in the digital environment.

Finland's national curriculum is responsive to opportunities and challenges in the digital environment.

The 2014 curriculum identifies transversal competencies* that are seen across subjects; these include multiliteracies, thinking and learning to learn, cultural competence, ICT competence, and working life competence, among others. Below the national curriculum level, local communities have a high degree of autonomy over their local curriculum and pedagogy, with the local curricula set by 311 municipalities. To support the development of local curricula, which gives more granular detail of the national curriculum, the Majakka Network was set up.[157] The network included a website with tools for curricula development. It hosted meetings with local schools, with support given to the municipalities to implement the transversal competencies introduced in 2014.[157] Like basic schools, secondary schools develop their local curricula through municipalities, ensuring that local communities have input into the curriculum, a process which also occurs in New Zealand through each school developing their local curriculum.[158,180]

There are two types of upper secondary schools, one general and the other vocational, with some degree of competition to attend, particularly, the general schools. Vocational schools focus on preparing young people for the workforce, with much of the assessment and training occurring in demonstrations, and practical work assignments in the workplace.[181] For upper secondary general schools in 2021, the transversal competencies were extended.[157]

In Table 7, the Finnish basic and upper secondary key competencies are outlined alongside the key competencies in the NZC which apply in both primary and secondary education.

Multiliteracies is included in both the basic and upper secondary competencies in the Finnish curriculum, and is closely linked to media and information literacy, this is not included in the New Zealand competencies.[182] The New Zealand key competencies include thinking, and using language symbols and texts that includes ICT.[183] The transversal competencies in basic education in Finland include thinking and learning to learn (that includes critical thinking), and ICT competence (that includes digital literacy). The curriculum in Finland has concepts connected with media and information literacy and digital citizenship embedded in the curriculum, with a significant push on a national level in both the curriculum refreshers and strategies since the early 2010s. The 2016 curriculum sought to link competences with subject specific objectives. However, like New Zealand,

* Transversal competencies are skills that are needed and formed across the curriculum; the curriculum seeks to integrate them across subjects and studies. In New Zealand key competencies is the term used. Transversal competencies comprise of certain skills, knowledge, values, and attitudes that are being increasingly emphasised as essential for effective participation and navigation in one's personal and work life in the current times. The seven transversal competences are part of all the subjects.

there has been commentary about to what extent multiliteracies and the other competencies are being utilised, resourced, and fully understood by teachers in the classroom.[184,185]

Table 7: The transversal/key competencies in the Finnish and New Zealand curricula.

Finland Basic education [180]	Finland Upper secondary [182]	Closest competency in New Zealand [183]
Thinking and learning to learn.	Wellbeing competence.	Thinking.
Cultural competence, interaction, and self-expression.	Interaction competence.	Using language, symbols, and texts.
Taking care of oneself and managing daily life.	Ethical and environmental competence.	Managing self.
Multiliteracy (includes media and information literacy online).	Global and cultural competence.	Relating to others.
ICT Competence.	Multi-disciplinary and creative competence.	Participating and contributing.
Working life competence and entrepreneurship.	Societal competence.	
Participation, involvement and building a sustainable future.		

Finland doesn't collect data on student ethnicity, which is likely masking substantive inequities

Sámi are the indigenous people of the Nordic region, whose indigenous lands span Norway, Sweden, Finland, and Russia. There are challenges with collecting indigenous data in this region.[186] The Finnish government does not collect data on ethnicity, instead collecting data on the mother tongue, which shows 2,023 people speak Sámi in Finland,[187] an estimated two percent of the total Finnish population in 2022.[188] There are likely to be differences between those who speak the language and those who identify with an associated ethnicity. The lack of data for the Sámi people extends to education, with no data on how different ethnicities are achieving compared to the average.[189] This means that every ethnic group is lumped together in education data, potentially masking inequities that are occurring.

In Finland, the Sámi parliament was founded in 1996 by the Finnish parliament. There are approximately 10,000 Sámi in Finland, with most Sámi living in Norway. While acting as a representative body of the Sámi, the parliament is legislated as a branch of the Ministry of Justice. It has an operating budget of around 2 million Euros, with the funding going to projects rather than service delivery.[190] The Sámi parliament has an education committee that advocates for the Sámi language and people to the Finnish parliament.[191]

Not all Finns experience the benefits of their education system equally. Recent immigrants are underserved, with government reports showing concern for inequities between Finnish born and immigrant children's education outcomes.[192] There was an acknowledgment that educators were likely insufficiently equipped to support immigrants.[192] Resources are generally not adapted for different groups, with limited translation and examples of codesign.

Any lesson drawing which occurs from Finland to New Zealand, needs to acknowledge that Finland is currently not adequately catering for their indigenous and diverse peoples, and that any programme, policy, or strategy needs to adequately cater for New Zealand's diverse population, embed Māori principles, and honour Te Tiriti o Waitangi.

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International comparisons key takeaways:

- Countries successful in this area have explicitly embedded media and information literacy and digital citizenship across their curriculum in different learning areas.
- Practical resources for teachers, young people and parents are readily available.
- There is national support and guidance for schools and teachers, including support from libraries and librarians who have extensive information literacy knowledge.
- Effective media and information literacy and digital citizenship overseas occurs within education systems that score highly in international testing, particularly reading.

3. Research, lesson plans, and gamification: media and information literacy and digital citizenship in practice

This section of the report focuses on the practical aspects of media and information literacy and digital citizenship. We look at the lesson plans, research, and gamification seen internationally that could work within a New Zealand context. We include case studies from New Zealand, especially how cultural understanding and principles offer a strong foundation for young people to build media and information literacy. Understanding their identity and place in the world can build resilience in young people. And in New Zealand, Māori values related to rangatiratanga (authority), whanaungatanga (obligations and responsibilities), and mana motuhake (mana through self-determination and control over one's own destiny) are important when implementing media and information literacy. There are a growing number of resources produced, many overseas. Part of effectively promoting media and information literacy and digital citizenship is having rich resources that reflect the New Zealand context, our curriculum and the local context of ELS, schools, and kura. There are core concepts and skills that will be drawn from the international context, with a strong evidence base underpinning these. A key part of international research is that media and information literacy and digital citizenship must be adapted for local contexts.[143] This section of the report therefore explores the international evidence base, before outlining aspects that are unique to New Zealand.

Part of effectively promoting media and information literacy and digital citizenship is having rich resources that reflect the New Zealand context, our curriculum and the local context of ELS, schools, and kura.

3.1 International research, lesson plans, and evidence

International thinking on building resilience to polluted information forms an important foundation for what media and information literacy and digital citizenship could look like in the New Zealand context. Countries and organisations internationally have conducted research into techniques and programmes that promote media and information literacy and digital citizenship and have produced lesson plans that are being used by teachers. The United Nations Development Programme Digital Public Good Alliance seeks to promote a wide range of open source digital solutions across the globe: as part of this work they do some work on polluted information, which highlights the importance of collaboration and drawing from the international evidence base.[193] When looking at how media and information literacy and digital citizenship could be strengthened in New Zealand we need to consider this research, drawing on it and adapting it for our contexts. This process of adaptation is supported by the international evidence, which prominently outlines the importance of ensuring that programmes, interventions and lessons reflect the local context.[143] There is a need to explicitly and intentionally teach media and information literacy and digital citizenship skills. A key enabler of this is ensuring they are on the educational agenda and that teachers, parents, and legislators understand their importance.[194]

There is a need to explicitly and intentionally teach media and information literacy and digital citizenship skills … and that teachers, parents, and legislators understand their importance.

Trust in institutions is an important part of combatting polluted information

A key component in combatting polluted information more broadly is people's levels of trust and acceptance in institutions. Institutions include government ministries, universities, and schools. Lack of trust in institutions has been seen to be a contributing factor in believing polluted information.[195] We rely on two sources for information, the first is experience and the other is 'testimony' from reliable sources. A central part of our knowledge derives from trusting the testimony of others (either institutions or individuals), so young people need to be given the tools to help them discern which testimony is useful to consider and techniques to ensure its veracity.[196] Recent research in Australia suggests that young people tend to trust their families and teachers the most.[197] There is a body of evidence that suggests polluted information fuels distrust in institutions,[198] although there is some debate over the extent this occurs.[199]

Balancing trust in institutions and legitimate criticism of institutions can be difficult. Part of this balance is equipping young people to understand legitimate critique compared with denial of evidence or a lack of evidence. Young people need to have a critical awareness of institutions, and to use their media and information literacy and digital citizenship skills to engage with them.

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A key part of ensuring greater trust in institutions is holding them to account when they do present information in inaccurate and misleading ways, and for institutions to correct and amend these types of errors. There is an onus on institutions to be trustworthy. If people hold the belief that institutions are intentionally misleading the public or hiding facts from them, using evidence from those institutions is not going to persuade them or change their understanding. A prominent example of mistreatment by institutions is the previous medical experimentation on minority communities in the US, which has led to lower trust in medical institutions in those communities.[200,201] The mistrust in these communities is thought to have contributed to diminished trust in institutions and medical science during COVID-19.[202]

Science education as part of combatting polluted information

Teaching scientific thinking can contribute to equipping young people to navigate polluted information.[143] This emphasises the need to embed media and information literacy and digital citizenship across all subjects in the curriculum. An example of this can be found in Case study 6**.** Equipping young people to understand scientific processes ensures they have protective knowledge that can help when they are confronted with polluted information: there is a need to teach these things explicitly.[194] This means that young people will be able to understand the use of scientific methodology, including an appreciation of uncertainty and that knowledge continually changes. When the evidence base for mask use changed in the pandemic, understanding scientific

methodology allowed people to understand that this wasn't simply scientists 'changing their mind' but rather that new evidence had shifted understanding, leading to different scientific conclusions.[196] It also means that people can dismiss or critique anecdotal or limited evidence, for instance understanding that just because a winter has been cold in one location doesn't mean that climate change doesn't exist. This requires scientists to better communicate uncertainty, and frame evidence as what we know currently, rather than just what we know.[196] Those with understanding of scientific methodology do not always use the evidence base, suggesting that other media and information literacy and digital citizenship skills are needed too.

It is important to teach young people the intellectual methods of science, the processes that surround scientific practices, and how science moves forward, rather than present science as a collection of fixed facts that do not change.[194] People can see content that reinforces their viewpoint whether or not it is backed by evidence, making it vital to have the skills to question and critically engage with information. Social media curation practices, presenting content based on demographics, previous watch history, or search and interactions, means that content that espouses a particular piece of information can be reinforced to an individual or group and that challenging a view that has been entrenched in this manner can be particularly difficult.[195] A broad understanding of how science works gives young people some of the tools to challenge content, and the processes used to generate that content.

A broad understanding of how science works gives young people some of the tools to challenge content.

Case study 6: Collective for youth empowerment in STEM and society

The Collective for Youth Empowerment in STEM and Society (CYESS) is an initiative by the US afterschool alliance that aims to elevate youth voices, providing them with STEM experiences and civic training.[203] The second part of their work is supporting adults in organisations to listen and engage with young people and their expertise. The idea is to support young people to have a seat at the table of decision-making. CYESS believes that many societal challenges are rooted in science, so young people need STEM and civic skills to tackle these challenges. Afterschool programmes offer a space where young people can be engaged on these issues, and the collective envisions they will act as a community of practice, learning from existing initiatives and programmes, including pilots, and then can scale these and share them throughout their community. While not directly addressing concepts of media and information literacy and digital citizenship, the founder of the collective believes that equipping young people with STEM and civic skills is a key part of ensuring young people can navigate polluted information.[143]

3.2 Methods and strategies

Media and information literacy and digital citizenship require skills and knowledge that are both specific to curriculum areas and wider activities as well as generic and employable across areas. For example, subjects such as English, Media studies, and Science already contain some elements of media and information literacy and digital citizenship, but Media Studies is only available to students in years 12 and 13. There are methods, strategies, and skills that can be appropriate across specific subject areas and are useful tools for young people to harness when navigating polluted information and understanding confirmation bias. These methods and strategies need to be mutually reinforced across learning areas, allowing for some level of consistency and generalisability of the media and information literacy and digital citizenship skills, and to ensure that young people are equipped with these core competencies, irrespective of their subject choices. Examples are:

Inoculation (pre-bunking)

Inoculation, or pre-bunking, is the process of discussing issues and topics in ways that may misinform, ahead of young people seeing or interacting with them online.[204] Inoculation involves people being exposed to small amounts of polluted information. They are then primed to have a strong rebuttal to the inaccurate information that outlines why it is misleading. They are taught how to identify the techniques that have been used to try and mislead them.[205] There is some evidence that over the short and medium term inoculation is relatively effective, particularly as it relates to identifying inaccurate information and the methods used to mislead people.[206] A smaller body of work shows the potential over a longer period, although this is less clear and there may be a need for frequent debunking to continue efficacy.[205]

Lateral reading

Lateral reading refers to a technique where you leave an article/content/video and look at other sources to verify the information within the content being consumed.[207] Lateral reading is seen to be an effective tool that allows corroboration of information.[208] It ensures that there is a moment to stop reading and think about the accuracy of the content as you search elsewhere for further information. This process can be more difficult to apply to video content, especially when it is consumed for entertainment.[208,209]

Critical ignoring

Young people develop the ability to ignore polluted information, not engaging with it in a positive or negative way and not sharing it. This is an important skill; some information isn't valuable to engage with, for example videos showing violence.[210] This technique is the focus of a UN campaign #pledgetopause that seeks to make people stop, think about the content they are viewing and whether they should share or engage with the content.[211]

Debunking

Debunking or fact-checking is a term used to describe presenting a corrective message that establishes the prior message as polluted information and gives the correct information; the correction is usually detailed.[212,213] The evidence that debunking is effective has been mixed; by debunking information, there is a potential risk of elevating and reinforcing the misinformation, especially when people have already formed an opinion.[212] There is a body of evidence that suggests that those who believe in conspiracy theories can continue to believe them even after correction.[214,215]

In the example below in Figure 2, there is a screenshot of an Instagram post, which claimed that there is an unlimited supply of oil being hidden from the public. This claim was fact-checked by two independent news outlets showing its inaccuracy. Despite the fact-check, the second post shows the top comments which claim that the fact the claim was fact-checked must mean that the post is true. The post is an illustrative example of how fact-checking and debunking, while they may be useful for the broader population, may have unintended consequences for those who already have entrenched views and have low trust in media and other institutions.[216]

Figure 2: A screenshot from Instagram on the left showing a post that has been fact-checked and the right image showing the top comments on the video, that claim that factchecking proves the post is truthful, an example of how fact-checking can have unintended consequences particularly for those with entrenched views.[217]

Reverse image search

A reverse image search refers to the ability to use an image as a search starting point, with images that match or closely match coming up in the search engine.[218] This can be a helpful tool when seeking the original source and context of an image and whether a post and its description match the image.

3.3 Both skills and more general dispositions are needed

Common Sense Media, a prominent NGO based in the US, outline in their digital citizenship curriculum, the importance of young people having the skills to navigate the digital world but the dispositions to enact those skills in their everyday lives.[219] It has been adapted and is being piloted and evaluated in Australia.[220] They outline five dispositions for digital citizenship:

- Slow down and self reflect: notice your gut reaction. Push beyond your first impression. Recognise situations can be complex.
- Explore perspectives with curiosity and empathy: be curious and open-minded. Think about other people's point of view. Weigh different people's values and priorities as well as your own. Consider moral, ethical, and civic responsibilities.

- Seek facts and evaluate evidence: investigate and uncover relevant facts. Seek, evaluate, and compare information from multiple credible sources. Be alert to disinformation and conspiracy messages.
- Envision options and impacts: envision possible courses of action. Consider how different choices reflect your values and goals. Stay alert to responsibilities to yourself and others. Evaluate possible impacts.
- Take action and responsibility: decide on a course of action that feels positive and productive. Make changes to digital habits to support wellbeing. Ask for help when you need it. Be an ally and an upstander.

We need to know the extent to which young people have opportunities to use evidence informed strategies that are fit for purpose and reflect our unique context as well as how well the dispositions that support their use are developing.

3.4 What questions do we need to ask when evaluating the reliability of information?

With the growing concerns around polluted information, more schools, businesses, and community groups are trying to equip young people with the skills they need. For example, the National Library has developed primary source analysis tools for teachers to work with students to help develop critical analysis skills.[221] Still, not all methods and strategies are evidence based, and ensuring that evidence and best-practice underpin what is taught to young people is key. While many more companies and organisations are producing content that seeks to address polluted information, not all of them are created equal. Many, even those produced by large companies, don't have a strong evidence base or haven't been evaluated for their effectiveness in different contexts. Some traditional approaches to information literacy, such as the currency, relevance, authority, accuracy, and purpose (CRAAP) checklist models have lots of questions that act as a checklist to ascertain a piece of information's accuracy.[222] While thorough and effective if used, careless application of this test can be misleading. The likelihood that a young person will have the 26 questions outlined in the checklist front of mind every time they watch a 10 second video on TikTok is unlikely, and the checklist hasn't shown efficacy when used in the social media, real world context.[223,224] Young people must not only be equipped with a method of accessing information that is effective, but also one which can be practically used when they are scrolling through their social media.

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The CRAAP checklist involves a series of questions under five themes: currency, relevancy, authority, accuracy, and purpose (see Table 8).[222] This checklist is thorough and could be useful when producing an academic paper or assignment, but there is limited evidence of its usefulness in the real world.

Table 8: Summary of CRAAP checklist.

Theme	Questions
Currency	• When was the information published or posted? • Has the information been revised or updated? • Does your topic require current information, or will older sources work as well? • Are the links functional?
Relevancy	• Does the information relate to your topic or answer your question? • Who is the intended audience? Is it academic or popular? • Is the information at an appropriate level (i.e., not too elementary or advanced for your needs)? • Have you looked at a variety of sources before determining this is one you will use? • Would you be comfortable citing this source in your research paper?
Authority	• Who is the author/publisher/source/sponsor? • Is it published in a scholarly or popular journal? • What are the author's credentials or organizational affiliations? • Is the author qualified to write on the topic? • Is there contact information, such as a publisher or email address? • Does the URL reveal anything about the author or source?
Accuracy	• Where does the information come from? • Is the information supported by evidence? • Has the information been reviewed or refereed? • Can you verify any of the information in another source or from personal knowledge? • Does the language or tone seem unbiased and free of emotion? • Are there spelling, grammar, or other typographical errors?
Purpose	• What is the purpose of the information? Is it to inform, teach, sell, entertain, or persuade? • Do the authors/sponsors make their intentions or purpose clear? • Is the information fact, opinion, or propaganda? • Does the point of view appear objective and impartial? • Are there political, ideological, cultural, religious, institutional, or personal biases?

Young people need to be equipped with questions they can ponder that are easy to remember and apply and become nearly automatic, even when the information is presented in short format on social media. The Stanford History Education Group is a prominent research group based out of Stanford University that offers lesson plans and research into effective media and information literacy and digital citizenship.[225] Their work has been used by organisations around the world and offers an alternative approach to evaluating the reliability of online information, that can be used effectively in a relatively short time. The three cornerstone questions in their civic online reasoning curriculum when looking at digital sources are:[223]

- Who is behind it?
- What's the evidence for this claim?
- What do other sources say?

These questions are used by professional factcheckers and offer a way for young people to respond to dubious information in a relatively efficient way that can be applied in real world scenarios online. Research by the Stanford History Education Group outlines that critical thinking is not enough when engaging with online content, and that some processes, like critically evaluating and paying close attention to unvetted text online, can be unhelpful for young people as they are more likely to believe the polluted information if they continue to be exposed to it.

For example, if young people look closely at an individual text without looking at other sources, who the article has been produced by, and what their intent may be, they may miss that it is espousing polluted information, especially if the information seems accurate, and could end up believing its claims.[226] It is therefore important to know when not to engage or look deeply into a particular text. Therefore, the Stanford History Education advocate 'critical ignoring' as an important competency for young people when looking at information online.[210] Critical ignoring refers to young people's capability to ignore polluted information, not engaging with it or its producers.[210,226] Click restraint, not clicking on an online source, website, or piece of information is another closely linked concept.[227]

Critical ignoring refers to young people's capability to ignore polluted information, not engaging with it or its producers.

3.5 What could media and information literacy and digital citizenship look like in the classroom?

Some examples of integrating media and information literacy and digital citizenship in learning areas are outlined by the Stanford History Education Group. They include schools adapting media and information literacy lessons for their geography and biology classes, where teachers worked with the school librarian to incorporate content they were already planning to cover, through a media and information literacy lens.[228] In a geography class, young people practiced lateral reading by investigating a viral video that critiqued the US handling of the COVID-19 pandemic that a Chinese state run media company produced. This learning was reinforced later in the year as part of a biology unit on nutrition, where young people considered what makes a social media post trustworthy by investigating TikTok nutrition videos. Teachers taught the lateral reading technique in both these classes, reinforcing learning across subject areas.[228] Using the same techniques and pedagogy across subject areas helps to develop a coherent curriculum and reinforce learning for young people.

Using the same techniques and pedagogy across subject areas helps to develop a coherent curriculum and reinforce learning for young people.

There is opportunity to incorporate specific lessons on media and information literacy, as well as integrating them across curriculum areas. The above example of the geography class and biology class using subject specific content but incorporating media and information literacy techniques and strands is an important example of making connections and threads across the curriculum.

3.6 Social and emotional learning: foundational in media and information literacy and digital citizenship

SEL provides a foundation for media and information literacy and digital citizenship, throughout a young person's life course. Emotional regulation, a component of SEL, is important in every aspect of young people's lives, and is a predictor of young people's academic success and mental wellbeing.[229,230] Combining emotional and social skills in teaching is a key to young people gaining these intertwined skills central to media and information literacy and digital citizenship.[230] Research has shown that information that elicits strong emotions is more likely to spread further, deeper and quicker online,[231] and it is clear that people's emotional reactions to a piece of information is an important part of how information is disseminated. While not all information that elicits strong emotions is polluted information, polluted information generally is content that seeks a strong emotional response and spreads widely.[232,233] SEL that includes the competencies of self awareness and self regulation are therefore important competencies to draw from when navigating a polluted information environment. Beyond this, as young people develop their social emotional skills, community membership, and social awareness is vital; understanding different people's perspectives, backgrounds, and compassion for others are all part of SEL and ultimately underpin much of media and information literacy and digital citizenship.[234]

While not all information that elicits strong emotions is polluted information, polluted information generally is content that seeks a strong emotional response and spreads widely.

While SEL skills develop and deepen across the young person's life course,[229] there is the potential to enhance learning through the curriculum, using specific interventions and techniques. Boston Children's Hospital Digital Wellness Lab outlines how teaching media and information literacy and SEL are intertwined and that young people must draw from their SEL skills when navigating the online environment:[235]

- When young people are considering what the writer of a message wants them to think, they are developing self awareness, perspective taking and social awareness.
- When young people think about what they should do, or not, in response to a message, they are practising self management.
- When they consider who a message is intended for, they are developing social awareness.
- When they question if they can trust a message, they are developing relationship skills.
- When they create healthy content on social media, they are exercising decision making.

There is potential to form questions and discussions specifically linking SEL concepts and media and information literacy and digital citizenship:[235]

- What does this content lead you to think? Why do the creators want you to think that?
- How does this content make you feel?
- Who is the content aimed at? What would their response and feelings be?
- What do you want to do after seeing this message?

SEL is both foundational and a potential part of media and information literacy and digital citizenship, and there is a need for further research into how media and information literacy and digital citizenship can better build on and enhance SEL, and understand how SEL skills at each learning stage contribute to media and information literacy and digital citizenship.[236] It is likely that teachers will need further development in ITE and PLD, regarding combining SEL and media and information literacy and digital citizenship, although there is evidence that staff have the capacity to teach SEL programmes effectively and integrate them in learning, so further development would be building on skillsets somewhat already in the workforce.[230]

MoE has acknowledged the importance of SEL and has produced resources that address SEL available for teachers, supporting them to integrate SEL into their teaching. The resource for ELS is He Māpuna te Tamaiti, which outlines effective practices that enhance SEL during Early Childhood Education (ECE). This resource includes strategies for teachers in their daily practice, promoting emotional competence and social competence. The strategies include establishing routines, developing care and empathy for others, building resilience, fostering peer relationships, and supporting young people to manage their learning. The concepts in this document therefore align with some foundational concepts in media and information literacy and digital citizenship.[237] Recently the evidence informed emotion, behavioural and cognitive regulation programme in New Zealand, ENGAGE, aimed at early childhood aged children has been scaled up with funding from the MoE. ENGAGE is focused on self regulation, a key building block and ongoing base for media and information literacy and digital citizenship. Self regulation helps young peoples' social decision making skills and ability to regulate their responses to both internal and external factors. Self regulation also supports young people's social decision making skills. The pilot programme has been extended to over 1,300 ELS after preliminary studies showed its effectiveness.[238,239] This is an important example of the potential to scaleup research and programmes when there is strong evidence of their success. He Māpuna te Tamaiti covers concepts related to emotional regulation and wider prosocial skills. These resources, including ENGAGE,[240] do not directly address the online environment, but endeavour to support SEL more broadly. There would be a need for resources that made the connection between SEL and media and information literacy and digital citizenship, if teachers are to effectively integrate these resources into their teaching.

There is an equivalent resource to He Māpuna te Tamaiti for primary and secondary schools, Positive Behaviour for Learning (PB4L),[241] which includes supporting resources: teaching for positive behaviour: supporting engagement, participation, and learning.[242]

Young people need to reflect on their own values, perspective, and ways of being

Young people need to assess the merit of online information with respect to their own cultural values, perspectives, and ways of being. Part of this process is understanding what shapes the way we see the world, and what the dominant cultural values are that surround us and the online environment.[243] Dominant cultural attitudes and frames might include the importance of individualism in the US, or the perspective that your success is attached to working hard in the EU.[243] In New Zealand, these might include the 'she'll be right' attitude, or egalitarianism. These cultural attitudes and values occur both at a state level and within communities, families, and individually. They impact how we see the world and how we make sense of information online. An important skill is knowing how one's collective beliefs and perspectives can be expressed and upheld safely online while seeking to understand and reflect on your views and perspectives and why and how they may

differ from others.[244] Another important skill is reflecting upon and questioning one's own beliefs and values and being given the space to do this in a supportive and constructive manner.

Part of this process is understanding what shapes the way we see the world, and what the dominant cultural values are that surround us and the online environment.

All young people have a rich kete of social experiences, beliefs, knowledge, and skills they can draw from. Their kete is shaped by their interactions with whānau, school, culture and community, and each young person's kete will look different to others. It is important that they are supported to be grounded in their values and given opportunities to practise identifying, articulating, and giving effect to their beliefs and values in digital spaces, while respecting others' beliefs, views, and perspectives that may be different to their own. They will have to make many online decisions with moral courage and integrity. They will need to be mindful of the values of others, respectful in their responses, and patient when learning from others who think about the world differently from them. In this sense, young people will need to understand and enact the concept of manaakitanga in online spaces; ensuring that their interactions uphold their own mana, while also leaving the mana of others intact.

… young people will need to understand and enact the concept of manaakitanga in online spaces; ensuring that their interactions uphold their own mana, while leaving the mana of others intact.

The incorporation of SEL at the curriculum level are discussed in Section 4.4.

3.7 Beyond skills and social and emotional learning: the other key aspects of media and information literacy

Keeping an open mind as a digital citizen

Being widely aware of the presence of polluted information and where it comes from is an important disposition, as is reflecting on how your own biases and opinions may differ from others. Some of the polluted information that young people encounter will be political and will include issues that are relevant to the politics and discussions of the day. Young people need the skills to navigate this, and understand the political and moral intent behind information. However, when designing a media and information literacy and digital citizenship curriculum, using explicitly partisan examples can be problematic[245] and educators need to be aware of the complexities of media representations and continually reflect on their own interpretations and practices.[246,247]

Young people should be taught how to think about different news sources and information rather than being told what to think about them.

Young people need to be taught how to think about different news sources and information rather than being told what to think about them.[245] This means that they are given the tools to think about political issues themselves and navigate a space that may include polluted information. When

discussing specific issues, this often means leading with shared principles and seeking to explain rather than persuade.[243] In practice, this means that young people are equipped with the skills needed to understand the intent, power dynamics, perspectives, and politics behind polluted information, but are taught in ways that don't use partisan examples. This is important and often challenging. Polluted information is not limited to one way of thinking or perspective, and it is important that young people can critically analyse their own biases, perspectives, and opinions as well as those of the creator of the content they are engaging with. For instance, when a political actor shares a post, being able to analyse the political actor's perspective, what the intent is behind the statement, who it is intended for, and how this may differ from other perspectives, are all vital. Effective learning in media and information literacy and digital citizenship enables young people to develop skills, values and attitudes that can be applied in every situation they encounter online (and offline).

Media and information literacy and digital citizenship are about understanding the industry, not just the content

Young people need to understand the media and technology industry, particularly how media is produced and how the industry operates, including the social media industry.[219] This includes understanding how the online environment is shaped, particularly by algorithms, platforms, targeted ads, and location based targeting.[219] Beyond this, young people must also understand their responsibilities as both creators and consumers of content. They might also become the content. This aspect of media and information literacy includes looking at companies and ascertaining what shapes their social media and the broader environment. Understanding how algorithms and AI shape timelines, including the content they see and content they don't, is an important topic to cover. Understanding what happens to their data is another important consideration, including the amount of data that companies gather, where data is stored, and what it is used for. Being able to critically engage with companies' decisions outside the platforms they create, like whether they are paying their employees fair wages, or the environmental impact the platform has, adds another dimension to the analysis. Media and information literacy and digital citizenship are therefore not only about being critical about content, but how content is created, disseminated, platformed, curated, and the actions taken by the platform, including those that occur offline.

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3.8 Gamification – games can be utilised to teach media and information literacy and digital citizenship

Games can be used as a tool to promote media and information literacy and digital citizenship (see Case study 7). One advantage is that once developed they are often freely available online and therefore do not have barriers to their use. Another is research showing that game based learning could positively impact young people's learning outcomes.[248] Depending on the game, they also can have supporting material that informs lesson planning. Bad News[249] is one example of a game that has been developed through a partnership between the University of Cambridge, the Dutch Media Collective, and a graphic design agency, Gusmanson.[250] The game makes the player a social media

account, placing them in the role of a content creator. The game then covers different techniques used to spread polluted information online, including impersonation of credible organisations or people, the use of emotion, polarisation, conspiracy, discrediting, and trolling. The players use these different techniques in the game to gain followers.[249] Research into the game's efficacy found the game decreases people's perception of the reliability of real world misinformation, especially those pieces of misinformation that used techniques identified in the game, with a lesser response for techniques not shown in the game.[206] This inoculation is designed to be active, with players learning through creating misinformation within the bounds of the game,[205] although the strength of the evidence base supporting the effectiveness of this intervention has been questioned.[251] Other examples of games include Cranky Uncle, developed by Monash University scientist John Cook, addressing climate change; Go Viral, produced in collaboration with the UK Cabinet Office addressing COVID-19 misinformation; and Harmony Square, developed with US Department of Homeland Security addresses political polluted information.[205]

Games don't just have to be online, with some formats working offline too. There are escape room games that have been developed to address polluted information, including an escape room by the University of Washington focused on building resilience to misinformation through reflection on biases and social media behaviours and young people being presented with their own vulnerabilities.[252,253] Save the Children in Finland ran an escape room, in cooperation with councils and training youth workers, focused on violent radicalisation. The escape room was designed with experts in the prevention of violent extremism and it sought to create a safe space for young people to learn, discuss and share their experiences as well as strengthen their critical thinking skills and citizenship skills.[254,255]

In the New Zealand context, Tohatoha produced an escape room focused on polluted information that is based on the escape room designed by the University of Washington. The escape room was designed to have participants experience various misinformation tactics with the ultimate goal that they reflect on and realise their own vulnerabilities.[252,255] Tohatoha provide support and PLD to school librarians before running the programme in school libraries (See Case study 12). Escape rooms and other interactive lessons offer a fun and engaging way of addressing concepts relevant to polluted information and the online environment more broadly. New initiatives such as the te reo Māori version of Minecraft,[256] and Ngā Motu, a world made by game designer Whetu Paitai, of Coromandel based Piki Studios,[257] also seek to teach children about Māori language and culture.[256]

Games may not be the whole solution, but are useful tools for teachers, librarians, and others delivering media and information literacy and digital citizenship to use as part of ensuring coherence and national coverage. Evaluation is a key part of ensuring the effectiveness of games and escape rooms and is important when ensuring consistency and cohesion across New Zealand.

Escape rooms and other interactive lessons offer a fun and engaging way of addressing concepts relevant to polluted information and the online environment more broadly.

Case study 7: MediaWatch - a game that integrates media and information literacy into statistics

MediaWatch is a game with the aim of supporting young people to think critically about graphs and diagrams. MediaWatch has been developed by researchers at Tampere University in Finland alongside the Strategic Research Council and the University of Helsinki.[258] The game offers insight into how media and information literacy could be included in the learning areas of Mathematics and statistics. The game is centred on a fictional island, with four different villages each with their own economy and industry and therefore own motivations and intent. The game uses press releases from the villages that contain graphs depicting fictional examples of social, economic, and environmental issues that are relevant offline, with a question about if and how the graph may have been manipulated. The idea is that young people traverse issues similar to those of the real world, gathering skills and understanding about how to critically engage with the information in the press releases and graphs, thinking about them and how they might apply these same skills outside the game. By placing the graphs as part of a press release, the young person is encouraged to reflect on questions that are key to media and information literacy: who is producing this press release? What is their intent? What do other sources say about this information?

The game explains and showcases ways that graphs may be used to mislead: the axis not starting from zero, reversing the axis, not having a consistently spaced axis, and the y axis being extended to obscure the graph.[258] After young people select the headline that best describes the graph, they are guided through why a graph is inaccurate and why the village may have decided to manipulate the graph. This gives young people a greater ability to make connections between manipulation and intent, in the game and how this might occur in the real world.

3.9 Drawing from and growing our own evidence base in New Zealand is key

More New Zealand research and development is needed

While there are growing bodies of research addressing media and information literacy around the world, New Zealand has a limited research base. There has been some research into the ways that young people are using social media sites by Māori researchers. For example, one study looked into how rangatahi use social networking sites, finding that they were using sites to connect with whānau, but that they were struggling with some of the blurred lines between the online and offline environment and that there was room for more support for young people as they navigated the online environment.[259]

Another study notes that Māori and other indigenous peoples use social media as a tool for activism and connection with their culture, with one example being the movement in Hawaii where indigenous Hawaiians have shared stories, posts, and information on social media to protest against the development of a telescope on a culturally sacred volcano.[260] Such research provides important data in the New Zealand context about young people's engagement in online spaces; however, there is currently not enough research to give us a clear picture of how New Zealand young people are engaging with, and responding to, polluted information online.

Another study researched how rural Māori students utilised a closed social media environment as an Educational Social Network. They functioned as a community of online learners, operating both inside and outside of their classrooms, demonstrating increased bonding and bridging social capital, and incorporating tuakana teina (peer group learning) relationships.[261]

Research and development must underpin evidence based practice. This means that there needs to be resourced efforts into producing New Zealand based research, considering the ways the knowledge might best be translated for schools, and developing interventions and resources that are relevant and authentic for the New Zealand context. While overseas research offers important insights into media and information literacy and digital citizenship more generally, there is little research going on in New Zealand into what effective media and information literacy and digital citizenship applied at scale would look like in our context. Research and development of new programmes and gamified learning are important,[206] particularly when considering the diverse needs and cultures of young people in New Zealand. There needs to be particular emphasis on understanding how media and information literacy and digital citizenship can be delivered within Te Marautanga o Aotearoa, the curriculum for Māori medium settings. Beyond this, consideration of how best to adapt programmes to different cultural and geographic contexts, and the needs of diverse learners more broadly, is needed, including refugee, immigrant, rural, LGBTQI+, and Pacific communities.

… there is currently not enough research to give us a clear picture of how New Zealand young people are engaging with, and responding to, polluted information online.

The European Commission funds research into media and information literacy, often via short to medium term projects, that focus on connecting research to practical resources that teachers, youth workers, and other people can utilise.[262] While the EU has a wider pool of funding for project based research, there is potential for project based research with practical implications to be supported in New Zealand.

Another critical component for teachers is being able to access quality research to extend their knowledge and have the opportunity to integrate this into their teaching. If the government supports research in the media and information literacy and digital citizenship area, then the issue of how to effectively disseminate will need to addressed, ensuring that those on the frontlines can access and utilise it.

What research is currently missing?

There are substantive gaps in the research, and there are many areas where substantive research would be helpful. Some examples are:

- Media and information literacy and digital citizenship in the New Zealand context, particularly for Māori, Pacific, and immigrant groups
- The efficacy of media and information literacy and digital citizenship methods and strategies when young people are using video heavy platforms with short format, like TikTok or Instagram reels.
- How the foundational dispositions on which to build media and information literacy and digital citizenship can be integrated into ECE.

- Levels of teachers' knowledge and skills for media and information literacy and digital citizenship and how ITE and PLD provisions can increase capability.
- Research and development of games and digital platforms that increase media and information literacy and digital citizenship and the instructional designs that are needed for teachers to optimise the effectiveness.

3.10 Lessons could be formed around Te Mana Raraunga: Māori Data Sovereignty principles

There is potential to build lesson plans and teaching resources around principles from the Māori data sovereignty movement, especially those associated with Te Mana Raraunga.[263] More broadly, data sovereignty advocates for peoples' rights and interests in data to be protected as the world moves into an increasingly open data environment and for the ethical use of data to enhance the wellbeing of people, language, and culture. The Mana Raraunga principles could form the basis of lessons for media and information literacy and digital citizenship that could be useful for both NZC and Te Marautanga o Aotearoa, with lessons focused on topics like ensuring the quality and integrity of Māori data and its collection, including Māori involvement in the governance of data repositories, and creating Māori data infrastructure and security systems. The Mana Raraunga principles are outlined below[264] with potential ideas for lessons that connect these principles with media and information literacy and digital citizenship following.

- Rangatiratanga (authority): how data is being used, who currently owns data? How can data be used to benefit those it is about? Where does the intellectual property associated with mātauranga Māori rest, and should this knowledge be freely accessible to generative AI technologies?
- Whakapapa (relationships): how is data collected and in what context? What are the long term impacts of AI and algorithms? How might this information or use of technology be harmful? How can that harm be prevented?
- Whanaungatanga (obligations): what are individuals rights and collective rights with their data and online more generally, what should they be? What are the current processes and practices of technology companies in relation to data and the online environment? Are they meeting their responsibility to those that use their technology or platforms?
- Kotahitanga (collective benefit): are data systems currently being used and designed in ways that benefit the individual and the collective? Do we currently have the people with the skillsets to enable the creation, collection, management, security and governance and application of data? Why is it important that we ensure this happens?
- Manaakitanga (reciprocity): is data currently being collected, used, and interpreted with respect for communities, groups, and individuals? What are examples when this hasn't occurred? How can we ensure that it does? Is it mana enhancing and in support of rangatahi? Were individuals or groups asked for consent for their information to be used in this way?
- Kaitiakitanga (guardianship): is data being stored and transferred in a way that enables people to look after their data? Are tikanga (customs and values), kawa (protocols) and mātauranga (knowledge) being upheld in the current online environment? Can people's data be easily found and accessed for their own use for the benefit of rangatahi?

These are expanded in the context of the curriculum in Section 4.3.

3.11 What are some examples of lessons and lesson plans?

In Table 9, some examples of lesson plans that different organisations have produced are outlined. These are mainly drawn from MediaSmarts, Canada's Centre for digital and media literacy;[265] Common Sense Education, an NGO based in the US that promotes digital citizenship;[219] and Stanford History Education Group's Civic online reasoning platform, focused on providing media and information literacy resources with a strong evidence base to teachers.[98,266] Just as in other areas of learning, the skills and depth of knowledge young people have will deepen over time, and so different topics will be more appropriate for different age groups.

This isn't an expansive list, but rather an indication of the types of topics that can be traversed in media and information literacy and digital citizenship. Beyond this, these resources are produced in different contexts with different cultures. When evaluating the utility of these lesson plans it is important to understand the need for school leaders and teachers to adapt them to the New Zealand classroom and young people as outlined in Section 3.1. While all learning areas could include media and information literacy and digital citizenship, some areas have stronger alignment with the principles of media and information literacy and digital citizenship education. In addition, the available resources are mostly teacher or researcher designed, whereas an important educational focus in New Zealand is to engage young people as agents in their own learning including in the design of digital activities.

Table 9: Lesson plans aligned with different learning areas.*

English	The arts	Health and physical education	Technology	Topics and techniques that run throughout
How media messages can communicate bias.[267]	How can videos be altered? How should we evaluate them?[268]	Unrealistic body standards and how social media shapes body image.[269]	Where is your data stored? How is it accessed and used? How does social media impact data privacy?[270,271]	Lateral reading – checking other sources for information.[9]
Sponsored content, how it is targeted and seeks to engage you.[272]	How AI can be used to create photographs, sound and videos.[273]	Dieting and nutrition advice on social media, who is an expert and what information should be trusted?[274]	What are social media companies or other tech companies' interests? How might this shape their platforms and technology?	What type of information is the content and how to assess this?[275]
How we can challenge our confirmation bias, and moving beyond seeking information that confirms something we think we know.[276]	Deepfakes and how they are made and used.[277]	Healthy and respectful online relationships [278] including conversation about digital consent and sexting	How do algorithms work? How might they impact what you see online? How is data used to impact them?[279]	Reverse image searching.[280]
What is the authors intent? Who is the audience?	How photos can be manipulated, and how to evaluate them.[280]	Fitness advice on TikTok, who do you trust and why?	What are the implications of individually curated content?[281,282]	How is the online environment affecting how you feel and your wellbeing?[282]

* Note that inclusion in this table is not an indication of endorsement.

Science	Mathematics and statistics	Social science	Learning languages	Topics and techniques that run throughout
Evaluating evidence on climate change.[283]	How data can be manipulated to show misleading information.[284]	What is bias? And how does it impact media and media online?[285]	How can culture and background shape our perspectives and understandings of the world online?	Click restraint, learning when not to click on the first result.[227]
Renewable energy, what does the evidence say using lateral reading?[286]	Why making claims based on correlation can be misleading and inaccurate.[287]	What makes a reliable source?		The difference between news and opinions.[288]
Evaluating the evidence base for a scientific issue and how it might change.[289]		How do people's perspectives shape what they hold to be true?		Evaluating evidence online, what is reliable evidence?[290]
Understanding uncertainty in science.		What are the geopolitics of the online environment? What is the role of information and polluted information in this?		What is AI? How can it be used? What is the potential for polluted information?[273,291]

Case study 8: a lesson plan in action - the tree octopus

A prominent example of a lesson plan is the tree octopus. The lesson plan has been used in different iterations since the 1990s. The lesson plan below has been adapted from the original Connecticut University New Literacies Lab lesson[292] to include the concept of lateral reading from the Stanford History Education Group.[10] It is focused on a fictional Pacific Northwest tree octopus. The task requires young people to fill out a worksheet answering questions regarding the octopus, followed by a class discussion about the accuracy of the information. The lesson encourages using strategies like lateral reading and asks young people to consider how the lessons might be applied in other situations. Several websites and resources are given as a starting point.

Lesson plan

Aim: students analyse and learn about checking the accuracy of the information on websites and wider skills and techniques about lateral reading and information online.
Evaluating the reliability of online information is a key part of media and information literacy. This activity asks the young people to analyse a number of spoof websites and authentic websites. It shows them the importance of lateral reading and assessing the website's content and layout to check its accuracy.

Topic: endangered animals

Level: 10-13 year olds

Lesson outline:

1. Show the young people the image of an octopus, and ask them what they know about the species. Tell young people they will learn about one endangered and rare species of octopus – the Pacific Northwest tree octopus. Do this seriously, highlighting the website they are to use. Go through the worksheet and what questions you want answered, and get the young people to divide into pairs to perform the task.

2. The worksheet can include these questions/prompts using the website provided:

    - What is the habitat?
    - Where is it located geographically?
    - What is the average size of the octopus?
    - How do they use their tentacles?
    - What colour are they usually?
    - Discuss their reproductive cycle?
    - What are their main predators?
    - Choose one way that you can help protect the species.

3. Once the class has filled out their worksheets, facilitate a class discussion, firstly by going through the worksheet, checking their answers, and secondly opening up the discussion by asking the class whether they think the tree octopus exists?

4. Ask the class what things made it seem credible and what things may give away that it wasn't a credible website.

5. Have a broader discussion about how what we see in the real world can be more convincing, but there are tools that we can use to help us to determine what is credible.
6. Looking at other sources outside of the website is important. This is called lateral reading. What types of sources should we look to? Offer some credible sources e.g., WWF endangered species list.
7. Discuss how the layout and style of the website is convincing? In what ways is it not? (Note that websites have changed significantly since this lesson was first produced).
8. Divide your students into pairs and get them to go to different pairs of sites, one credible and one that is fake (There are seven sets of websites that are included in the lesson). Which website is which and why? (Note that the environment has changed since this lesson was first produced and many websites that contain false information are far more convincing than the websites outlined in the lesson).

Beyond the octopus lesson – making connections to other media and information literacy and digital citizenship concepts

While this lesson is an important starting point, there is potential to draw further lessons around this concept and stretch students to think about other areas some examples are outlined below:

- A lesson focused on critically engaging with content on social media, e.g., a TikTok video about aliens or celebrity conspiracies etc.
- A lesson focused on lateral reading, jumping off a website and looking at other sources is an important tool and way of understanding the accuracy of information.
- How AI and deep fakes could produce videos, photos, and documents of the tree octopus that look real, and how does this change the way we see.
- What happens when algorithms and AI put something like the tree octopus in our feed? Why is it important to critically engage with what we see on our feeds and question its reliability?

3.12 What resources are available in New Zealand?

We have heard from teachers and seen internationally that there is a need for practical resources which they can use in the classroom.[219,228,293] Section 3.10 showcases some of the lesson plans that are available internationally. Currently, there are limited resources and adaptable lesson plans in the New Zealand context, with some of those available outlined in Table 10.

Table 10: Lesson plans and resources available for teachers.

Provider	What resources are currently available?
Netsafe	There are some resources available through Netsafe which can be used to help create a lesson, but these are limited in scope in terms of content and number. Several topic pages on their website include content about polluted information and responses to it giving some broad overviews on topics.[139] Netsafe has developed several 'learning moments', which can be used for a less than 20 minute activity in a broader lesson. There are currently six of these learning moments that include some polluted information content.[140] They have also started a website, 'Your News Bulletin' campaign with Facebook, centred around a six question quiz about 'fake news'.[141] All content is free for teachers on the Netsafe website.[140] There is potential for more provision of evidence based material, which would require significant resourcing and capacity building.
Manaiakalani Education Trust (MET)	MET, see Case study 9, produces resources for schools and provides PLD to teachers focused on digital competence and literacy. The PLD team run a programme called Cybersmart, which supports teachers and schools in delivering a range of digital citizenship topics in the classroom. One of the themes in the Cybersmart programme, which is often requested by teachers, is called smart media.[293-295] Smart media is focused on equipping learners to critically examine information online and includes lesson plans for different age groups, links to online games and external websites, and the thinking behind smart media.[294] Beyond this, they produce videos of teachers in the classroom delivering lessons; teachers can access these to see a lesson plan in action and the planning behind the delivered lesson. The Manaiakalani PLD team draw on a range of resources locally and from overseas to form their programme and went through a crowdsourcing process harnessing knowledge from teachers and experts from all over the world in their initial phase of their cybersmart programme. They are now using resources created by teachers who have gone through their programme and see this teacher generated content as particularly valuable.[293] Their resources are available on their website publicly but are predominantly used by the schools they work with; currently over 120 schools in clusters throughout New Zealand.[293]
Resources from overseas groups	There is a raft of resources available from overseas research groups and NGOs, and different schools may draw on these resources. Technology companies are also producing different resources for schools to use; these range from Google's 'Be Internet Awesome' programme,[234,296] Facebook's collaboration with Netsafe,[141,296] and Microsoft's 'Spot the Deepfake' site.[297] Content produced by technology companies and social media platforms can be helpful tools but should be underpinned by a strong evidence base and adapted or placed within a localised context. Without adaption and a strong New Zealand 'flavour', young people may perceive them as irrelevant and unhelpful.
MoE resources	The current resources available from MoE are limited in the media and information literacy space. There are some lesson plans around digital citizenship on the Te Kete Ipurangi site,[298] as well as broader resources for 'enabling eLearning focused on digital teaching and learning'.[151] There is a website focused on the technologies learning area, called 'technology online', which is connected to the Te Kete Ipurangi site and provides resources and information about the technology area of the curriculum, including digital technology.[299] There is currently limited content related directly to media and

	information literacy from the MoE, and even fewer resources that could help teachers with practice in the classroom.
Tohatoha	See Case study 12.

Having readily available adaptable lesson plans and teaching resources will support teachers, who have different knowledge and skill levels in media and information literacy and digital citizenship, as they use them in an appropriate local context.[300] Lessons plans need to be age appropriate, reflect different themes and issues at each stage of learning, and be easily aligned with the curriculum. Teachers will often need to adapt lesson plans, ensuring they have examples and explanations of particular relevance to young people's needs and the local school and community context.

3.13 A central hub of resources?

A media and information literacy and digital citizenship hub could be a common place for teachers to access and share quality and fit for purpose lesson plans

A rich repository of New Zealand focused resources is needed to support teachers with their lesson planning, which can easily be adapted to local contexts. If there was a common place where a bank of evidence informed resources were curated, it may facilitate systematic updates of the resources in the face of changes in the online environment. Estonia has a common platform, supported by the government, where teachers can create and adapt lesson plans from templates produced by other teachers, as well as share their own lesson plans. The platform is called 'esisuloome'[301] and sits alongside the platform on which the government provides lesson plans and resources, 'ekoolikott'.[284] Both sites include content addressing media and information literacy and digital citizenship.

New Zealand has the equivalent resource, Te Kete Ipurangi,[302] and Kauwhata Reo for Māori medium[303] which includes some lesson plans that touch on concepts relating to media and information literacy and digital citizenship. This will be replaced by an online curriculum hub to support changes to teaching practice over the next five years.[304] There is potential in New Zealand to include dedicated material similar to that available on the Estonian sites, wholly for media and information literacy and digital citizenship with lessons focused on integrating these into different learning areas. MET, see Case study 9, identifies the importance of teachers having a place to share resources and the value in teachers seeing different approaches to media and information literacy and digital citizenship.

Some key things the platform might offer teachers include:

- Lesson plans and resources mapped to the curriculum.
- The ability to share resources that teachers have created and communicate with other teachers about media and information literacy and digital citizenship programmes of learning.
- Accessible research or research summaries on the effectiveness of lesson plans and resources including appropriate curriculum levels and the degree of teacher augmentation are needed.
- Case studies of effective practice (from schools/kura/ELS in New Zealand).
- Links to international resources/exemplars.

Beyond a place for educators, it is important to offer a common place for:

- Resources and information for young people so they can upskill independently or work alongside their peers to solve digital challenges.
- Resources for parents, caregivers, and whānau to expand their knowledge, experiment with new media and information literacy and digital citizenship approaches and strategies at home, and better support young people.

3.14 Young people need their own resources too

Research by Gibson into what young people want from mental health services in New Zealand found that many young people turn to their peers for support and resources with regard to mental health.[49] Young people may not discuss in detail what they see online with their parents, caregivers, whānau, or teachers, but are likely to do so with their friends and peers. Peer networks shape a young person's engagement online, as they negotiate not only polluted information, but also the responses of others in their network to that material.

Producing resources, such as Chatsafe,[305] that are targeted at supporting young people is a vital part of media and information literacy and digital citizenship. Young people need to be included in the process, helping to form and guide programmes, interventions, and resources that might be produced.[143] The research shows that when media and information literacy and digital citizenship are reinforced in different spheres, including at home and with their peers, young peoples' skills are more likely to develop. Having a trusted place that young people can access information about different topics is an important consideration for resourcing. Beyond this, a process of codesign would be important for these peer to peer resources and resource development more broadly. Ultimately, young people need to be involved in forming resources as well as programmes and interventions,[194] because they are experts in how they are utilising the online environment.

Young people may not discuss in detail what they see online with their parents, caregivers, whānau, or teachers, but are likely to do so with their friends and peers.

Key takeaways:

Evidence-based is key:

- New Zealand based research will play an important role in the development of a media and information literacy and digital citizenship response; however, this research base is currently somewhat limited.
- Drawing on international research to form interventions and programmes is important while New Zealand develops its own evidence base.
- Trust in institutions, or lack of trust in institutions has a significant impact on young people's ability to navigate polluted information.
- Having an understanding of scientific methodology can help young people navigate polluted information.
- Using non-partisan examples and maintaining an open mind to minimise our own biases is important.

- Young people need their own resources and opportunities to support their peers.

Skills and dispositions are both needed:

- Skills involved like those in lateral reading, checking sources, or seeking to understand the intent of the creator.
- Dispositions, like reflecting on the impact content has on you, or being inquisitive about the accuracy and intent of the content.

Schools and teachers need ongoing support:

- ITE is an essential source of baseline skills and knowledge for teachers.
- Centralised, practical, and evidence based support, including adaptable lesson plans and other resources, could be collated, and put into a single place for teachers to access. Lesson plans need to be relevant to the New Zealand context and reflect the different progressions of learning.
- Peer to peer support is an important part of delivering media and information literacy; including being able to share ideas and successes and fix troubleshooting. An online platform could offer this support.
- Schools and teachers have resources they can adapt to their local contexts, the cultural and linguistic strengths of their community and individual young people's needs.

Games can be a tool:

- Games and other interactive content online can be an effective way to engage and teach young people, if they are attractive to learners.

4. Te Whāriki, The National Curriculum, and Te Marautanga o Aotearoa: embedding media and information literacy and digital citizenship

Media and information literacy and digital citizenship play a vital role in equipping young people with knowledge, skills, and dispositions to face the changing environment, they are basic skills needed for the 21st century. While these concepts are incorporated into the teaching of media studies,[306] it is also important to incorporate media and information literacy and digital citizenship across the curriculum to prepare all young people for the demands of the 21st century.[307,308] This section of the report focuses on what media and information literacy and digital citizenship can look like in our curricula, starting in early childhood and moving to the school-aged curricula, drawing on international best practice and outlining how this could be adapted to the New Zealand context.[309]

The curricula: an opportunity to embed media and information literacy and digital citizenship
New Zealand has three curricula. Two are for the mandatory schooling sector, the NZC and Te Marautanga o Aotearoa for kura and Māori medium schools.[183] Both specify at a high level what should be taught by schools, with each individual school or kura setting a local curriculum that seeks to bring the national curriculum to life, reflecting the needs, identity, language, culture, interests, strengths, and aspirations of a school or kura's learners and whānau.[11] Currently, media and information literacy and digital citizenship are not widely identified across all the learning areas in either of the school age national level curricula. However, both curricula offer opportunities for media and information literacy and digital citizenship to be more explicitly defined and fully embedded.

There is also a curriculum for the non-mandatory early childhood sector - Te Whāriki (He Whāriki Mātauranga mō ngā Mokopuna o Aotearoa Early Childhood Curriculum). Being a licensed provider of ECE requires compliance at a basic level. It has four principles underpinning the pedagogy and practice in five strands of learning, each with a set of outcomes. For example, in the strand 'communicating', there are seven outcomes. The document already provides the building blocks for emergent forms of media and information literacy and digital citizenship. For example, there are multiple references to critical thinking and being critical, informed, and responsible citizens and it expects teachers to 'support children to develop an understanding of security and safety when communicating in a digital world.' The predisposition to be empathetic and collective wellbeing are present in Te Whāriki too.

Rapid change: the need for a curriculum that is applicable now and in the future
Given the current curriculum refresh, the aims of the Literacy & Communication and Maths Strategy, and the greater specificity being developed in the Common Practice Model (see Section 4.5), it is important to consider and showcase where and how media and information literacy and digital citizenship can be integrated in the local curriculum, and that teachers, curriculum leads, and principals have a strong grasp of these concepts as they are integrated into the wider curriculum.

The online environment is moving rapidly, with significant changes occurring each year … The curriculum can't move as fast as the online environment …

The online environment is moving rapidly, with significant changes occurring each year (Section 1.6). The curriculum can't move as fast as the online environment; and the last NZC was set in 2007.[310] The technology learning area, including digital technologies, was updated in 2017, reflecting significant changes in this space.[311] Te Marautanga o Aotearoa was formed in 2007, and updated in 2017.[312] But even since this update, there have been numerous changes in the online space, including new platforms and tools from TikTok to ChatGPT.[36,313] The challenge when shaping a media and information literacy and digital citizenship curriculum is the need to focus on the knowledge and skills that young people and the community need now, while still being relevant as the online environment changes.[219,314] A key part of this is having enduring principles, values and attitudes included, which will continue even as the specific skills may adapt and change.

4.1 Setting the foundation: the importance of self regulation and media and information literacy and digital citizenship in the early childhood curriculum

Te Whāriki, refreshed in 2017, is the early childhood curriculum and is expected to be used by the ELS sector to guide their practice and local curriculum.[315] Te Whāriki has links to the NZC in that it helps to facilitate the transition between ELS and school. The early childhood curriculum is an important part of the wider system that promotes media and information literacy and digital citizenship. Key social and emotional skills that are foundational for media and information literacy and digital citizenship, such as those in self regulation develop over these early years. Self regulation is a particularly important aspect of media and information literacy and digital citizenship, with the young person's ability to identify how information makes them feel, and how they respond to it is a key part of navigating said information. The next educational building block, of asking why this information may make you feel a certain way, requires this foundation.

There is some inclusion of content in Te Whāriki that refers to keeping children safe and secure online.[315] There could be potential for more inclusion, with a dual acknowledgement that even very young people are increasingly using devices, and that their capability to understand or navigate this environment is more limited than their older peers.

4.2 What concepts could be built on in Te Whāriki?

Table 11 outlines the links to SEL and media and information literacy and digital citizenship in the five strands of Te Whāriki.[315]

Each ELS provider decides how they implement the curriculum, and how they run and teach their centre, with monitoring of their service occurring through the Education Review Office (ERO). The place of programmes in supporting the uptake of SEL as well as coherence and consistency across providers needs to be addressed. One recent example is the programme, ENGAGE, (see Section 3.6), which promotes self regulation skills through intentional play. The games are approximately 30 minutes daily and have moved from a pilot trial to over 1,300 centres with a funding boost.[239,240] Programmes such as ENGAGE offer coherence and consistency across New Zealand. There is a need to consider how programmes, like ENGAGE, promote emotional regulation and prosocial skills, and may help move the important principles seen in Te Whāriki into practice. Te Whāriki has the potential to support the foundational skills, ethics and values for media and information literacy and digital citizenship, providing a coherent strand that weaves into the two school age curricula.

Table 11: The learning strands in Te Whāriki and how they may link to media and information literacy and digital citizenship.

Strand	Learning outcomes	How could it act as a building block for media and information literacy and digital citizenship?
Wellbeing | Mana atua	Children become increasingly capable of: • Keeping themselves healthy, caring for themselves. • Managing themselves and expressing their feelings and needs. • Keeping themselves and others safe from harm.	This strand is closely linked to emotional regulation. These skills form an important part of media and information literacy and digital citizenship, and research shows that starting these skills at a young age is important.
Belonging | Mana whenua	Children become increasingly capable of: • Making connections between people, places, and things in their world. • Taking part in caring for things, understanding how things work, and adapting to change in their ELS. • Show respect for the kaupapa, rules, and rights of others.	This strand is linked to the importance of a sense of belonging and connection to community for media and information literacy and digital citizenship, and establishing a safe and respectful online presence.
Contribution | Mana tangata	Children become increasingly capable of: • Treating others fairly and including them in play. • Recognising and appreciating their own ability to learn. • Using a range of strategies and skills to play and learn with others.	This strand links to the importance of respecting others in the online environment.
Communication | Mana reo	Children become increasingly capable of: • Using gesture and movement to express themselves. • Understanding oral language and using it for a range of purposes. • Enjoying hearing stories and retelling and creating them. • Recognising print symbols and concepts and using them with enjoyment, meaning, and purpose. • Expressing their feelings and ideas using a wide range of materials and modes.	This strand links to emotional regulation, understanding their own perspectives and feelings and developing an understanding of language, all of which are important building blocks for media and information literacy and digital citizenship.
Exploration | Mana aotūroa	Children become increasingly capable of: • Playing, imagining, inventing, and experimenting. • Moving confidently and challenging themselves physically. • Using a range of strategies for reasoning and problem solving. • Making sense of their worlds by generating and refining working theories.	This strand links to the early stages of critical thinking and problem solving, both important foundations of media and information literacy and digital citizenship.

4.3 What does embedding media and information literacy and digital citizenship in the New Zealand Curriculum and Te Marautanga o Aotearoa look like?

A deliberate teaching focus on knowledge, capabilities, and skills

The NZC describes the difference in granularity from the national curriculum to the classroom curriculum: "Curriculum is designed and interpreted in a three stage process: as the national curriculum, the school curriculum, and the classroom curriculum. The national curriculum provides the framework and common direction for schools, regardless of type, size, or location. It gives schools the scope, flexibility, and authority they need to design and shape their curriculum so that teaching and learning is meaningful and beneficial to their particular communities of students. In turn, the design of each school's curriculum should allow teachers the scope to make interpretations in response to the particular needs, interests, and talents of individuals and groups of students in their classes."[316] All three stages need to be considered in the context of embedding media and information literacy and digital citizenship skills.

Te Marautanga o Aotearoa and NZC are inherently different. The way media and information literacy and digital citizenship are embedded in each curriculum would need to be shaped by the different curriculum objectives and the principles underpinning them. However, there will be common principles and concepts that would be included in both curricula. Developing high levels of media and information literacy requires specific knowledge and skills[100] including cognitive skills of 'criticality' (e.g., critical evaluation, reasoned judgements, identifying accuracy and credibility of information).[232] How they are taught effectively will change over the school years but, even at young ages, foundational parts of these concepts can be learned as outlined in Section 4.2,[317] and digital tools can be used effectively to promote psychosocial and cognitive skills even in the younger years.[318]

The evidence, including that from PISA (2018) on 21st century skills shows the need for a specific focus on media and information literacy in order for young people to gain the relevant skills and dispositions, as outlined in Section 3.[106,228] It is important that these skills are supported in different learning areas and become repeated practice and reinforced as young people move through into school, kura, and Māori medium education.[228] Parents and whānau play an important role in supporting media and information literacy and digital citizenship in their young people and can be a key partner for schools; Section 7 outlines how this could occur.

It is important that these skills are supported in different learning areas and become repeated practice and reinforced as young people move through into school, kura, and Māori medium education.

Values and attitudes form a solid base to build curriculum knowledge and skills

Competence in media and information literacy and digital citizenship requires knowledge, skills, attitudes, and values.[13] Values and attitudes add the means to apply skills, and to learn from and respond to new contexts and challenges as they arise. Ensuring that there are values and that the reflect what is unique to New Zealand is vitally important.[316]

UNESCO outlines the importance of the following values and attitudes underpinning the learning outcomes and competencies in the curriculum:[13]

- Inter-cultural dialogue and inter-religious dialogue.
- Freedom of expression, freedom of information, and freedom of participation.
- Tolerance and respect for others.
- Awareness of self and value of challenging one's own beliefs.
- Understanding of international human rights standards.
- Sustainable development, solidarity, and peace.

These values and attitudes underpin those that are unique to New Zealand and our communities. In particular, values unique to tangata whenua in New Zealand could be included. Many of these values and attitudes can be found Te Marautanga o Aotearoa[312] and could be applied to the online environment. These offer important insights for the values and principles that local schools may want to include when teaching media and information literacy and digital citizenship. The following italised statements come directly from Te Marautanga o Aotearoa:[312]

- '*The learner is respectful of the mana and spirituality of each person and their whānau, and their attitudes and values, even when they differ from their own'* in the online environment.
- The learner has '*empathy and regard for friends and the school whānau'* including on social media and online.
- The learner can '*identify and understand their own values and beliefs'* and use them to shape their engagements in the online environment.
- Young people understand '*the values of their whānau, hapū, and iwi*' and these help guide their interactions and way of being' in all spaces online.
- The learner '*acknowledges people, regardless of who or where they are, or their appearance'* including in the online environment.

There are broad values that schools, both Māori medium and English medium, should seek to uphold, and that many already have as part of their school's values:

- Honouring and upholding Te Tiriti o Waitangi.
- Manaakitanga – ensuring that interactions are caring and respectful.
- Rangatiratanga – giving young people the information and understanding they need to make informed choices, and exercise their personal leadership and agency.

There are key lessons to be learnt from the Māori data sovereignty movement

Section 3.10 outlined how support for teachers to design lesson plans could be formed around the Te Mana Raraunga principles, which are related to the network's purpose. The principles outlined in that section would also be valuable additions to the curriculum.

The Māori data sovereignty movement has concepts, ideas and framing that are helpful when considering what media and information literacy and digital citizenship looks like in Te Marautanga o Aotearoa and in the NZC. Below is what Te Mana Raraunga, outlines as its purpose:[319,320]

- Asserting Māori rights and interests in relation to data.
- Ensuring data for and about Māori can be safeguarded and protected.
- Requiring the quality and integrity of Māori data and its collection.
- Advocating for Māori involvement in the governance of data repositories.
- Supporting the development of Māori data infrastructure and security systems.
- Supporting the development of sustainable Māori digital businesses and innovations.

Teaching needs to utilise, establish, and build on strengths across the life course

Our curricula acknowledge that young people bring strengths from previous learning in family, home, hapū, iwi, and community contexts, and teaching must build on these progressively through early learning and schooling. In the NZC, progressions framework for schooling allows for greater development and understanding across young people's time in formal education, with young people moving through the different progressions, deepening their knowledge and extending their skills overtime.[321] This framework could be used over the course of schooling to develop strong media and information literacy and digital citizenship skills they can use throughout their life.

4.4 What learning outcomes and competencies are critical in a media and information literacy focused curriculum?

UNESCO developed a potential media and information literacy framework which can be used by educators[13] and includes pedagogical suggestions that enables media and information literacy and digital citizenship to integrate with an existing curriculum.

UNESCO developed a potential media and information literacy framework which can be used by educators…. that enables media and information literacy and digital citizenship to integrate with an existing curriculum.

These competencies and skills are wide ranging, from those that young people need to produce digital content, to understanding media institutions, to things that directly address polluted information. Some examples that are most relevant to polluted information are included in Table 12.[13]

Digital citizenship: the importance of including social and emotional skills in the curriculum

The importance of social and emotional skills and SEL has been highlighted in Section 3.6**,** which acknowledges that as well as being foundational for all learning, these skills are critical components of media and information literacy and digital citizenship. Our curricula should promote the resilience of young people by developing media and information literacy, digital citizenship and social emotional skills together.[322] Making reasoned judgements and considering the believability of alternative viewpoints require perspective taking and aspects of cognitive and emotional empathy.[323,324]

Table 12: Competencies and learning outcomes from the UNECSO media and information literacy curriculum.

Broad learning outcomes	Competencies for media and information literate person who:
Critically evaluate information, media, and digital content.	Can assess, analyse, compare, and evaluate information and media, as per the initial criteria for assessment of the information encountered or received; can identify and debunk misinformation such as conspiracy theories; can also critically evaluate the information providers for authenticity, authority, credibility and current purpose, weighing up opportunities, and potential risks.[13]
Be able to use ICT with critical capacities.	Is able to transcend the basic use of ICTs, in order to understand the development of ICTs – the processes, mechanisms and conditions of ICT development, its ownership, control, and path dependencies.[13]
Locate and assess relevant information relating to personal, educational, political, cultural, religious, and other societal needs.	Is able to apply search techniques and locate, as well as assess, information and media content effectively, and efficiently and knowledge of the provenance, ranking logic, and data that is derived from generating search results – connecting to social and development issues.[13]

Making reasoned judgements and considering the believability of alternative viewpoints require perspective taking and aspects of cognitive and emotional empathy.

In Finland (see Section 2.1), self regulation is seen as an important basis for media and information literacy. SEL including self regulation, is included in basic education years 1-9, and these skills are included as one of seven transversal competence areas.[325] It is also in the early childhood education and pre-primary education curriculum that includes young people up to age 7.[326] The NZC has a similar key competency, called 'managing self'.[327] 'Managing themselves and expressing feelings and needs' is also a learning outcome in Te Whāriki. In Te Marautanga o Aotearoa, in values and attitudes, the curriculum highlights the importance of a young person's confidence, personal identity, personal awareness, and self worth.[312] Having these identified foci on emotional and social learning in these three curricula, has the potential to underpin the teaching of media and information literacy, as well as strengthening these skills in other areas. MoE has produced resources that address SEL, including the Guide to Positive Peer Relationships.[328]

In addition, online forms of interpersonal skills (e.g., perspective taking, empathy and prosocial skills) as well as self regulation, underpin the positive digital citizenship skills needed for individual and collective resilience. Like the parallel with self regulation, there are key competencies in both NZC and Te Whāriki which reflect these aspects of sociability such as 'relating to others' and 'showing respect for kaupapa, rules and the rights of others' (see also Sections 3.5 and 3.6). Te Marautanga o Aotearoa includes these concepts in values and attitudes highlighting the importance of 'empathy and regard for friends and the school whānau' and working 'cooperatively with peers and in groups' and being 'respectful of the mana and spirituality of each person and each whānau, and their attitudes and values, even if these differ from their own'.[312]

Embedding media and information literacy and digital citizenship across the curriculum

There are some advantages to a standalone subject on media and information literacy, including the ability to have specialist teachers in the subject area,[265] and mitigate the risks of a fragmented approach.[329] However, there is significant advantage to also embedding media and information literacy across the curriculum, with many curricula produced by organisations and research groups doing this.[265,330] Firstly, integration enables media and information literacy to be expanded upon across subject areas, reinforcing concepts. Secondly, it is more manageable for teachers to fit it in when it is spread throughout the wider curriculum.[265] It will be important for all teachers to develop generic, core skills in media and information literacy and integrate them across a range of applicable subjects, or in their specialist learning area in the case of secondary teachers.[265] It is also important to teach whole concepts in each learning area, rather than a piecemeal approach.

There are some advantages to a standalone subject on media and information literacy, including the ability to have specialist teachers in the subject area … However, there is significant advantage to embedding media and information literacy across the curriculum …

For example, a lesson that has been produced by MediaSmarts, Canada's centre for digital and media and information literacy, for secondary students (14-18 years) is called Consensus or Conspiracy? The lesson plan outlines what a scientific consensus means, how new data can lead to it changing, and then what conspiracy theories are and how they form. It could be delivered in a science or social science class (see also Section 3.1). There are practical examples of an issue and how consensus has changed, including the example of tobacco and lung cancer and how the scientific consensus had not accepted that the risk of lung cancer was increased by tobacco in the early 20th century, and how this shifted by 1950, when there was body of strong evidence proving that this was the case. The aim is that young people will be able to identify through digital tools when there is a consensus on an issue, have the ability to identify relevant and nonrelevant information, find information to support or challenge a point of view, and evaluate the expertise of a source of information.[289] See Section 3.11 for more discussion of lessons.

The Nordic countries: what does embedding media and information literacy look like?

The following four Nordic countries[145] embed media and information literacy or closely related concepts across their curricula.[331] The methodology of this embedding varies:

- Finland: through two cross curricular competencies - multiliteracies and digital competence, with both concepts central to media and information literacy.[176,331]
- Sweden: digital competence has been incorporated into overall goals and into the syllabus for some subjects, with digital competence including critical understanding of technology and the ability to evaluate information.[331]
- Norway: digital skills is one of the five basic skills, incorporated into competence goals for each subject and includes the ability to process, interpret and evaluate information from digital sources and develop digital judgement.[331]

- Denmark: information technology (IT) and media is one of three interdisciplinary themes, with these integrated into teaching and incorporated into each subject. Being able to analyse information and become a responsible participant online are two key aspects.[331]

Each country has a slightly different way of including media and information literacy and embedding it across the curriculum, in part due to each curriculum being different. Where media and information literacy can best fit within the curriculum in New Zealand needs to be assessed through deep engagement with teachers in schools. For further information about these countries, see Annex 6.

4.5 How could media and information literacy and digital citizenship be embedded in the New Zealand Curriculum?

The Common Practice Model: a chance for supporting media and information literacy and digital citizenship

The Common Practice Model is a draft strategy document that provides pedagogical approaches and practices to support the teaching of literacy, communication, and mathematics.[332] It recognises the need for explicit teaching of clearly specified knowledge and skills for literacy.[149] This includes a critical literacy pedagogy that aims for young people to recognise that text is socially constructed and not neutral, and to ensure they have the ability to interrogate and construct text. It also includes a critical mathematics pedagogy, that aims to equip young people to think critically about societal issues through and in mathematics, like critically thinking about the data used in statistics.[149] The Common Practice Model identifies multiliteracies as a specific pedagogical approach to literacy and communication. The model contends that 'multiliteracies recognise multiple modes of making meaning (visual, gestural, audio, spatial, and linguistic) within a range of social, cultural, and linguistic contexts.[149] The Common Practice Model has the potential to include media and information literacy more explicitly. If media and information literacy and digital citizenship were to be included, it would be consistent with international examples of best practice. This could occur through the inclusion of key concepts such as helping young people to define media, understand photo manipulation, search effectively, understand their responsibilities as creators, understand the basics of an online news article,[219] and learn how to be a good digital citizen. The corresponding Ako Framework for Māori medium affords a parallel opportunity.[333]

The opportunity of key competencies

Using and developing key competencies is dependent on the knowledge students have and how they are successfully embedded within learning areas.[334] The key competencies (see Annex 7), within the current curriculum have the potential to offer a place for media and information literacy and digital citizenship to sit within specific learning areas of the refreshed NZC. An ERO report in 2019 called for the provision of greater clarity to teachers around the key competencies and more resources to support classroom practice.[335] The same ERO report acknowledged the importance of media and information literacy* and highlighted the need for young people to critically engage with information they access and use online. The report outlined that media and information literacy is implicit within the thinking competency.[335] However, in order for young people to develop and exhibit media and

* The ERO report referred to media and information literacy as information literacy.

information literacy they require specific tools, techniques, and understandings that, while underpinned by thinking and critical thinking, are not the same.

...in order for young people to develop and exhibit media and information literacy they require specific tools, techniques, and understandings that, while underpinned by thinking and critical thinking, are not the same.

There are two challenges to this opportunity. In the current NZC, the five key competencies do not directly address media and information literacy or the social and emotional skills for digital citizenship.[335] There is potential to embed media and information literacy into the key competencies like Finland does, either through greater emphasis within the key competencies or through a new key competency that could reflect Finland's multiliteracy competency. Multiliteracy is reflected as a pedagogical approach in the Common Practice Model. Teachers, school leaders, and schools would need support to implement a new competency, or changes to the key competencies. However, the second issue is that currently there are no agreed and required measures of the development of these competencies (see Section 6), or their equivalents in ELS.

There is potential to embed media and information literacy into the key competencies like Finland does, either through greater emphasis within the key competencies or through a new key competency that could reflect Finland's multiliteracy competency.

The NZC supported variation in how promotion might occur noting: "Schools need to consider how each of these aspects of the curriculum will be promoted and developed in teaching and learning. They can do this in different ways."[183] There have been calls to address the general (not digital) social and emotional needs of young people, which repeatedly note declining aspects of mental health and the central role education has in developing the requisite positive skills.[336,337] How can we embed in different learning areas.

Critical thinking, a core skill underpinning media and information literacy, is in all learning areas currently, and has continued emphasis in the social science refresh[338] as well as the framework for the mathematics and statistics, and English curricula refresh.[339] Like critical thinking as a broader skill, there is potential to explicitly include media and information literacy in the different learning areas. The various learning areas offer different levels of potential to integrate media and information literacy and digital citizenship. While this report does not outline specifically what the curriculum should look like at each learning phase, it is clear that there would be increasing complexity over the life course with young people developing their skills and traversing different topics as their learning continued to grow. This section is not supposed to be a media and information literacy and digital citizenship curriculum, but rather an indication of how the current curriculum offers opportunities to embed media and information literacy and areas of alignment.

Social science

The New Zealand histories component of the curriculum refresh (see Annex 7) has been centred on our unique local context, and focused on the histories which are unique to New Zealand. Central to this is Te Tiriti and the responsibilities that derive from this, as well as understanding our cultures and collective identities.[338] Some of the concepts outlined in the refresh include understanding different peoples' perspectives and how they shape their decision making, critiquing authorship of sources, examining how information represents, persuades, or manipulates.[338] Within the refreshed New Zealand histories curriculum there are multiple places where media and information literacy concepts could be embedded.

Some examples of areas that could include this expansion are outlined below, followed by the topics and concepts that could be included.

In the Understand (big ideas) section:

- E koekoe te tūī, e ketekete te kākā, e kūkū te kererū | People hold different perspectives on the world depending on their values, traditions, and experiences:[338] how polluted information can shape peoples perspectives of the world and the importance of understanding other people's perspectives when interacting online.
- Ki ngā whakaeke haumi | People participate in communities by acting on their beliefs and through the roles they hold:[338] the concept that people can be motivated to act on polluted information that they hold to be true.
- Tuia i runga, tuia i raro, tuia i roto, tuia i waho, tuia te muka tāngata | Interactions change societies and environments:[338] how the online environment shapes societies and environments.

In the Know (contexts) section:

- Ngā ahurea me te tuakiri kiritōpū | Culture and collective identity:[338] how a strong sense of self and community can positively impact how people navigate the online environment.
- Te tino rangatiratanga me te kāwanatanga | Sovereignty, organisation, and government[338] digital citizenship and the ways that people exercise freedom of expression online.
- Te tūrangawaewae me te taiao | Place and environment:[338] how polluted information can impact on peoples' understanding of place, contribute to different ideas about human activity, and the consequences to the natural world.

In the Do (practices) section:

- Te kohikohi, te tātari, me te whakamahi mātāpuna | Collecting, analysing, and using sources:[338] could be expanded to include online resources, and interrogate which online sources can be trusted.
- Te tautohu uara me ngā tirohanga | Identifying values and perspectives:[338] the values and perspectives that people share online and in the media.
- Te whakaaro arohaehae mō ngā wā o mua | Thinking critically about the past:[338] diverse interpretations of the past that people share and see online and the need to critically think about the universality of these interpretations.

- Te whakapuaki i ngā tautohe me ngā whakaaro mā te whakamahi ritenga tikanga ā-iwi | communicating arguments and ideas using social science conventions:[338] The potential for polluted information to be accepted or formed when evidence, logic, social science concepts and conventions, are not used for analysing information.

Each of these examples is at a high level but shows that the social science curriculum has areas where media and information literacy and digital citizenship fits and could be explicitly placed. This is acknowledged in the revised social science curriculum documentation.[338]

English

The English curriculum has undergone a refresh. English has many opportunities to include media and information literacy. There are already significant critical thinking skills that are emphasised in this learning area, and the importance of interpreting and creating text.[339] Relative to many other countries, English classes in New Zealand do somewhat equip young people in the broad skills needed for media and information literacy, without specifically addressing these in the curriculum. Up to 80% of our 15 year old young people report learning about aspects such as the consequences of making information public online; judging whether to trust information from the internet; or comparing different webpages and deciding the relevance of information.[45] In addition, the recent analysis of the PISA reading results, which examined critical literacy, found that 61% of these young people were correct when asked to distinguish fact from fiction (one item only). This was higher than the international average (47%) and similar to Canada, Australia, and the UK. The challenge is to deepen these skills within English and apply them to the online environment, including social media, and promote these skills in other learning areas. Below there is an outline of how a stronger focus on media and information literacy and digital citizenship could be included inside the refreshed curriculum:

In the Understand (big ideas) section:

- Ko te reo me ōna tikanga te hā o te whakawhitiwhiti kōrero | Communication depends on shared codes and conventions:[347] how these conventions are changing in the online environment and how the online environment can contribute to these shared codes and conventions changing or breaking down.
- Ko te manu e kai ana i te miro nōna te ngahere; ko te manu e kai ana i te mātauranga nōna te ao | Literature, language, and texts embody power relationships:[347] how information spreads online, including polluted information, and who these narratives seek to exclude.

In the Know (contexts) section:

- Ngā whāinga me ngā hunga mā rātou ngā tuhinga | Text purposes and audiences:[347] the purpose and audience of online texts, including social media.
- Ngā ariā | Ideas within, across, and beyond texts:[347] the importance of using evidence based evaluations for online text, including social media and the creators of online content.

In the Do (practices) section:

- Te whakamahi rautaki ki te whai māramatanga | Comprehending and creating texts:[347] strategies like lateral reading, that are essential when considering online texts, including social media and strategies for assessing the reliability of sources included in young peoples' own text.
- Te tātari arohaehae | Critical analysis:[347] the importance of lateral reading for texts both online and offline, especially critical ignoring.

Some of these ideas are incorporated in the refreshed English learning area documentation.[339,340]

Mathematics and statistics

Mathematics and statistics has undergone a refresh. Mathematics and statistics offer several touchpoints where media and information literacy and digital citizenship could be included, particularly statistics which could include promoting data and statistical literacy,[339,341] by including: where critically reflecting on one's own and others' use (and potentially misuse) of data, and justifying and checking what is reasonable are expected

- How misinterpretation of statistics can be used on social media and media more widely to spread misleading and polluted information.
- How uncertainty can be used to spread misleading and polluted information.
- How graphs and figures can be misrepresented.
- How the way the data is collected impacts its applicability and accuracy (this is already included in the refreshed curriculum).

Some of these ideas are included in the refreshed Mathematics and statistics learning area documentation.[342]

Technology

The Technology learning area hasn't been refreshed yet, but did receive an update in 2017. The technology learning area generally takes a cross-curricular approach during primary school, with young people learning a technological area as part of a topic or theme. In secondary school, the young people specialise in particular technological areas like digital technology and more physical forms of technology like metalwork or woodwork.[299]

The Technology learning area outlines the importance of young people critically engaging with the impacts of technology; there is no explicit mention of social media, although this is mentioned in the guide for schools developing their local curriculum in response to the technology learning area update.[343] There is mention of developing algorithmic thinking, but not engaging in a critique of algorithms and their role in forming the online environment.[311] There is an opportunity to include identifying, understanding and critiquing AI, that will continue to become more relevant for young people.[344] Through the process of the Technology learning area being refreshed, there is a significant opportunity to include media and information literacy and digital citizenship within this learning area. The Technology learning area provides an opportunity to include media and information literacy in a cross-curricular way. There is an opportunity to include a media and information literacy and digital citizenship strand. Below are examples of where media and information literacy and digital citizenship principles could be included in the current strands.

The Technological practice strand:

- The ethics of algorithms, individualised curated content, AI, and targeted advertising, and what being a digital citizen with these things in mind would look like.
- Whether current codes of practice and legal requirements by social media and digital companies are fit for purpose, and what considerations are taken when forming these.
- Strategies and skills for navigating the online environment.

The Technological knowledge strand:

- How algorithms on social media work, how AI works, and how platforms keep their clients on their platform.

The Nature of technology strand:

- A critique of how social media impacts society.
- An understanding of polluted information and the role that technology plays in its formation and dissemination.

The following learning areas are yet to be refreshed, so the 2007 NZC is used as reference for where these concepts could be included. Where applicable, the strands are highlighted, before an indication of where there could be inclusion and concepts that fall under the strands. In some learning areas where inclusion in each strand is not clear, several concepts for inclusion are highlighted.

Health and physical education

This is an area with substantive potential to include media and information literacy and digital citizenship concepts, particularly in areas such as nutrition, sexuality, fitness, mental health, alcohol sponsorship of sport, education and relationships.[183] Much of the information that young people are receiving about these issues comes from the polluted online environment.

Strand A: Personal health and physical development:

- How social media and online interactions can impact wellbeing.
- Identifying and describing the differences and similarities between 'real life me' and 'online me'.
- The importance of balancing time online with time doing activities offline.
- Fostering the values and attitudes that young people want to express online.
- How social media can give distorted ideas of what real bodies look like, and include content on promoting body image.
- Mental health content seen on social media and the importance of checking other sources.

Strand B: Movement concepts and motor skills:

- How to critically engage with fitness experts on social media and the internet and the importance of wide reading when getting fitness advice.
- The importance of checking the veracity of health claims in content that is advertised or promoted to them.

Strand C: Relationships with other people:

- The importance respecting other people regardless of their identity online.
- Understanding that you can disagree respectfully with others online.
- The importance of respectful relationships and friendships online.

Strand D: Healthy communities and environments:

- How cultural and societal values and attitudes can offer a helpful place to draw from when navigating the online environment, and how they may shape other people's interactions online.
- Could include their rights, responsibilities, and laws in the online environment, including information about the HDCA.

There is some key content that is important to cover when age-appropriate for young people in the health and physical education curriculum:

- The importance of digital consent.
- How pornography often doesn't reflect sex offline and can promote unrealistic body image and practices.

Science

As described in Section 3.1, science offers many opportunities to include media and information literacy and digital citizenship. It is a particularly important area as there are many areas of polluted information online that are focused on science topics. This section highlights potential concepts to include in the different strands.

Nature of science[183]

- The importance of scientific peer-review, and what sources and processes are considered credible in science.
- How to understand where there is uncertainty in science and how to communicate this.
- The importance of considering scientific methodology, the nature of scientific inquiry (or lack of scientific inquiry) when claims are made including online and on social media.
- How media (including social media) can make sweeping claims about a scientific area from a single study and that it is important to weigh this against the body of evidence as a whole.
- The use of scientific methodology as a way to test ideas and claims.

In the context strands living world, planet Earth and beyond, physical world, and material world

- There could be an inclusion of the importance of lateral reading, and looking at multiple sources when there are claims made about the different areas of science (See Case study 8).
- Could include the importance of using and understanding what constitutes credible sources of scientific information.

The arts

The arts offer some opportunities to discuss and develop skills that relate to media and information literacy and digital citizenship, particularly in creation of content and emphasising the importance of critically engaging with images and videos online and how these can be manipulated or created.[183] It therefore could be important to include the following concept into the arts curriculum:

- How images, videos and audio can be altered, changed, and created with the intent to mislead and spread online, including through AI.
- The value of reverse image searching as a tool to interrogate sources (See Section 3.2).

Learning languages

There are some opportunities within the learning languages learning area to include media and information literacy and digital citizenship.[183]

- How different cultural perspectives can shape beliefs online.
- How different social norms, understandings and perspectives help to shape the online environment and what people in different parts of the world may post online.

4.6 How could media and information literacy and digital citizenship be embedded in Te Marautanga o Aotearoa?

The curriculum is shaped by tirohanga Māori (Māori worldview) and, while having some similarities with the NZC, is inherently different.[312] Te Marautanga o Aotearoa offers rich opportunities where media and information literacy and digital citizenship could be embedded. The curriculum is currently undergoing a redesign, concurrently with the NZC.

If media and information literacy and digital citizenship were to be embedded in Te Marautanga o Aotearoa, there would need to be a thoughtful and robust consultation process. Te Marautanga o Aotearoa would require careful adaption and codesign in alignment with te ao Māori principles. A key part of the international evidence base is the importance of adapting media and information literacy and digital citizenship to local contexts and ensuring that a curriculum is underpinned by the values, principles and dispositions that are of importance and relevance to local communities. Te Marautanga o Aotearoa has a set of principles and values that underpin it, and there is substantive potential for these to be relevant, and ultimately form a foundation to a media and information literacy and digital citizenship programme.

Te Marautanga o Aotearoa already refers to the importance of e-learning as an effective method of teaching and learning for the current generation of rangatahi Māori. This is an important starting point upon which media and information literacy and digital citizenship can be built. media and information literacy and digital citizenship have some core techniques, like lateral reading, questioning the author's intent, thinking critically, and the ability to ignore content critically, that would be key to include in the curriculum. Te Marautanga o Aotearoa would ultimately have these shared techniques combined with the unique values, attitudes, and principles its marau (curriculum) is grounded in. In this section of the report, we highlight areas in the 2017 Te Marautanga o Aotearoa where concepts central to media and information literacy and digital citizenship align or could align. This isn't meant to be prescriptive, but rather highlights those things already in Te Marautanga o Aotearoa that can be applied to the online environment or the opportunities to expand Te Marautanga o Aotearoa to include media and information literacy and digital citizenship.

Table 13 outlines where media and information literacy and digital citizenship can be included in the overarching principles; Table 14 outlines where they could be included in the values and attitudes; and Table 15 outlines where they can be included in different learning areas.

Table 13: Where media and information literacy and digital citizenship could fit in the overarching principles of Te Marautanga o Aoteaora.[183,312]

Principle	Key points	How could it link to media and information literacy and digital citizenship?
The learner is the centre of teaching and learning.	The curriculum will: • Affirm the learner. • Support the learner's physical, moral, mental, and emotional wellbeing. • Provide experiences that enable learners to reach their potential across each learning area. • Strive to develop knowledge, skills and attitudes which enable competent learners.	This principle has links to digital wellbeing, including how you treat others online and understanding your individual identity. It has important links to the skills and attitudes to navigate the online environment that are key to learners' success in work and life. A tirohanga Māori media and information literacy and digital citizenship focus might be on the development of concepts like manaakitanga (reciprocity and respect) for self and others in online contexts. e.g., in what ways can data collection, use and interpretation uphold the dignity of Māori communities, groups, and individuals?
The learner has a high level of personal awareness.	The aim is for the learner to be confident in the Māori world, and secondarily in the wider world, the curriculum will: • Promote whānau and iwi. • Provide experiences that bring together customary practices of iwi and communities. • Help learners to be successful in the Māori world and wider world. • Fulfil the expectations, hopes and aspirations of their communities. • Provide experience and knowledge that will enable the learner to competently enter the wider world.	This principles links to the importance of culture and community connection as potential protective factors and the importance of rich offline experiences in shaping attitudes and values. It links to the importance of media and information literacy and digital citizenship for young people to operate in the wider world, particularly the online environment. A tirohanga Māori media and information literacy and digital citizenship focus might be on the development of concepts like whanaungatanga. e.g., in which online spaces must collective Māori rights prevail over those of the individual?
The learner achieves their potential.	Experiences will be provided that: • Engage the learner. • Develop the desired competencies, attitudes, and values.	This principle could include the way young people interact online, and the competencies, values, and attitudes they use while navigating the online environment.

	• Enable the learner to achieve learning outcomes to their level of ability. • Are inclusive and responsive to the learning needs and ways of learning of each individual.	A tirohanga Māori media and information literacy and digital citizenship focus might be on the development of concepts like kaitiakitanga (guardianship and ethics) e.g., how will tikanga, kawa (protocols) and mātauranga (knowledge) underpin our engagements in online spaces?
School, whānau, hapū, iwi, and community will work together.	The curriculum should: • Ease the pathway for whānau to participate in all school teaching and learning programmes. • Include experiences outside of the school which are relevant to the whānau and community. • Nurture the language and customs of whānau, hapū, and iwi.	This principle links to the importance of whānau being included in media and information literacy and digital citizenship. A tirohanga Māori media and information literacy and digital citizenship focus might be on the development of concepts like kotahitanga (collective benefit, capacity, and connection) e.g., How can online engagement facilitate the sharing of strategies, resources, and the attainment of common goals?
Environmental health is personal health.	The curriculum supports: • A sustainable environment. • Learning pathways which enable the learner to engage purposefully with the environment. • Holistic teaching programmes. • Learner engagement with their environment.	This principle links to environmental issues often being a source of polluted information, and the high importance of understanding the evidence and how it connects to personal health. A tirohanga Māori media and information literacy and digital citizenship focus might be on the development of concepts like whakapapa (relationship and connections) e.g., How might the potential of global information transfer via digital platforms be harnessed to solve wicked problems like the restoration of Papatūānuku?

Table 14: Where media and information literacy and digital citizenship could fit in the values and attitudes.[183,312]

Value or attitude	Summary	How does it link to media and information literacy and digital citizenship?
Individual learners develop values and attitudes.	• Confidence through integrity, generosity of spirit and peacefulness. • Have a sense of personal identity, self-worth, and personal awareness. • Empathy for others. • Participate in school activities. • Respect for education. • Understanding and aptitude in learning as a guide to the contemporary world. • Understand their own personal values and beliefs.	This links to the importance of dispositions, values and attitudes when navigating the online environment. It links to how an understanding of who you are is also important online.
Knowing traditional Māori values.	• Understands values of their whānau, hapū, and iwi, enabling access to the Māori world. • Is generous and caring for visitors. • Knows their identity and origins. • Knows their genealogy and whakapapa links. • Works co-operatively with peers and in groups.	This value links to drawing from culture, the importance of caring for others and how a strong sense of identity can be protective factor.
Understanding the values of the wider world.	• Acknowledges people regardless of who or where they are, or their appearance. • Is respectful of the mana and spirituality of each person and each whānau, and their attitudes and values, even if they differ from their own.	This value links to the importance of understanding other's perspectives and respecting these online. It has links to addressing individualised curated content and hearing from different perspectives.

In the different learning areas

There is significant opportunity to include media and information literacy and digital citizenship into the learning areas. In the table below some of the potential areas are highlighted.

Table 15: where media and information literacy and digital citizenship could fit in the learning areas.[183,312]

Learning area	The Strands	media and information literacy and digital citizenship could include or expand:
Te reo Māori	• Oral: focused on speaking and listening. • Written: focused on reading, writing, presenting, and viewing. • Paralinguistic: including presenting and viewing.	• The strategy of 'critically analysing traditional Māori text (oral and written)' to explicitly include modern text including online and on social media texts. • The process of lateral reading. • The language strategy 'adapts written text in order to persuade or convince the reader to engage with the writer's intention', to include critiquing and questioning the intent of text online.
Pāngarau	• Number and algebra. • Measurement and geometry. • Statistics.	• How graphs and statistics can be used to mislead and can be manipulated. • Note that the following is already included in Level 6 Statistical literacy "Evaluate statistical reports in the media by relating the displays, statistics, processes, and probabilities used in the claims made" which forms an important media and information literacy base to expand.
Hauora	• Personal health and development. • Movement concepts and motor skills. • Health and environment. • People and relationships.	• How social media can shape perceptions, and the importance of using an evidence base and wider reading when making decisions. • How social media impacts hauora, mental health and wellbeing, and sense of self. • Includes science and technology in movement that could include how social media and information online can shape our understandings of movement, and the importance of reading widely environmental, scientific, and technological knowledge. • Includes safety, that could specifically mention online safety for self and others. • The importance of respecting others online, digital consent and how pornography can inaccurately depict sex and relationships (when age appropriate). • Different peoples' values and attitudes, and how they express these online, and how your own can be positively shaped by the community around you.

Tikanga-ā-Iwi	• Social organisation and culture. • The changing world. • Place and environment. • The economic world. • Social inquiry.	• The mana, rights and responsibilities of people online. • Online participation in democratic and/or consensus processes. • How culture and identity can be expressed in the online environment. • The importance of lateral reading when accessing sources of information. • How different authors' perspectives shape the text and aim to understand the intent of the author. • How the online environment is currently shaping peoples' perspectives, ideas, and opinions. • The systems that technology companies have in place, and critically engaging with the ethics of these.
Ngā toi	• Exploration. • Creating. • Knowing. • Appreciation.	• How images, videos and audio can be altered, created, and shaped to create polluted information, including through AI and other technology?
Pūtaiao	• The natural world. • The physical world. • The material world.	• The importance of scientific peer review. • The importance of reading widely to consider scientific information online, including from a range of knowledge systems. • How to understand when there is uncertainty in science and how to communicate this? • The importance of considering scientific inquiry or lack of scientific inquiry when claims are made including online and on social media. • Lateral reading, and looking at multiple sources when there are claims made about the different areas of science. • The importance of using, understanding, and critiquing what constitutes credible sources of scientific information, and the different perceptions of this.
Hangarau	• Concepts of technology. • Technological practice.	• How AI and algorithms are shaping the online environment. • Whether the current social media system is serving the needs of communities, especially hapū and iwi Māori. • Whether the current AI and other technology companies are considering the environment in their decisions. • The importance of Māori data sovereignty.
Te reo Pākehā	• Using language in everyday settings.	• Lateral reading. • Questioning an author's intent, including in the online environment.

	• Using language for academic purposes.	• The differences between opinion and fact, and how to distinguish these especially online. • The different purposes of text in the online environment. • How emotive language and convention can shape our response to text?
Ngā reo	• Communication. • Language. • Knowledge. • Cultural. knowledge.	• How different cultural perspectives can shape their beliefs online, • Understanding the different perspectives that may have shaped a creator of content perspective.

Key takeaways:

The curricula can include foundational concepts central to media and information literacy and digital citizenship, both as stand alone units in media and information literacy and digital citizenship and embedded across the curriculum:

- Self regulation is an important foundational concept, especially for younger children.
- NZC already includes SEL, but there is potential for more.
- Young people are using digital devices, so some basic skills around this age, mainly focused on safety, are helpful.

We currently don't embed media and information literacy and digital citizenship in the NZC or Te Marautanga o Aotearoa, but we need to:

- Explicitly embed media and information literacy and digital citizenship across the curricula.
- Include principles and values to guide the media and information literacy and digital citizenship curricula.
- Use the curriculum refresh as an opportunity to embed media and information literacy and digital citizenship.

Common ideas, adapted for each subject and curriculum:

- There are common strands to media and information literacy and digital citizenship that can be applied across the curricula in both the NZC and Te Marautanga o Aotearoa.
- Subjects have areas where they can explicitly include media and information literacy and digital citizenship and the extent of inclusion will vary depending on the subject.

Media and information literacy and digital citizenship as a key competency in the NZC and as part of the values and principles in Te Marautanga o Aotearoa:

- Media and information literacy could be included in the values or principles section of the NZC and Te Marautanga o Aotearoa, highlighting it as a key area across the curriculum, and acknowledging it as a key skillset for young people to harness in future.
- Media and information literacy could be included as a key competency, a reflection of countries overseas, and an acknowledgement that equipping our young people to navigate the online environment is a vital life skill.

5. National uptake, coherence, and consistency

What every education provider teaches will be slightly different since the system relies heavily on individual schools, principals, and teachers deciding on the most effective content and pedagogies, keeping up to date with best practices, upskilling and practicing teaching as inquiry, and managing their budget priorities with their board. This means that teachers are required to be 'adaptive experts' in designing the local curriculum and the appropriate instruction of said curriculum in the classroom.[345] These conditions are associated with considerable variability in the various metrics used to judge system effectiveness. The education system is judged to have high variability, school by school, in achievement outcomes in international comparisons,[346] and in national databases.[347,348] ERO examined wellbeing outcomes and judged 16% of the sample of secondary schools and 11% of the primary schools had systems that were well placed to promote young people self management and social confidence and respond to young people's needs. There were few examples of deliberate teaching of self management and social confidence.

This devolved system needs to be factored in as we navigate the inclusion of media and information literacy and digital citizenship with coherence and consistency. This section of the report focuses on the levers that can be pulled nationally to ensure that every young person, irrespective of their school, is equipped with the skills they need to navigate the online environment. Some of these levers have been discussed elsewhere in the report but we bring them together here to discuss how to establish greater consistency nationally.

Beyond this, currently, every school has different levels of technology, some schools provide devices, others enable 'bring your own device' (BYOD) and there is a large variety in the digital infrastructure that each school has. In order for media and information literacy to be enabled and digital citizenship to be fostered, young people, teachers and schools need access to quality devices and systems supporting them. There will need to be a greater level of consistency in what devices, programmes and infrastructure are available to each school. See Annex 2 for more detail about the current system.

5.1 Overseas, government bodies with responsibility for media and information literacy build cohesion and coherence

A government body with legislative responsibility to promote media and information literacy and digital citizenship has helped countries overseas build and support a cohesive media and information environment (see Section 2). The responsibility of these bodies has been wide ranging, including support and resources for parents, the education system, libraries, and NGOs, conducting research and offering seminars and workshops. Often the body sits outside the country's Ministry of Education, and this can give the potential for wider media and information literacy activities, including support for adults and older people as well as the work associated with promoting young people's media and information literacy skills. The government body that is tasked with promoting media and information literacy and digital citizenship can be tasked with forming a national plan/strategy that seeks to promote media and information literacy and digital citizenship. This needs to be done carefully to ensure that the institution retains broad public support.[349] A national plan or strategy has been an important first step when envisioning and implementing a system that supports media and information literacy and digital citizenship, as seen in the country comparison outlined in Annex 6.

A national plan or strategy has been an important first step when envisioning and implementing a system that supports media and information literacy and digital citizenship …

A government body, much like KAVI in Finland (see Section 2.1), could administer a central bank of resources and provide direction to other quality resources produced by other media and information literacy and digital citizenship stakeholders, as outlined in Section 3.12.[138,350] Countries including Finland, Norway, Sweden, Ireland, Denmark, The Netherlands and Iceland have government bodies that include a mandate to promote media and information literacy and digital citizenship. In these countries, the bodies are responsible for classifying media, the equivalent to Te Mana Whakaatu The Classification Office in New Zealand, although each office operates in slightly different ways.[351-356] Each of these countries expanded the mandate and responsibility of their Classification Office to include media and information literacy and have dedicated staff for media and information literacy promotion.

Te Mana Whakaatu The Classification Office is an independent Crown Entity.[357] The office has produced research about the current state of polluted information in New Zealand and potential actions that can be taken to combat polluted information; this included the role of media and information literacy.[130] Expanding the Classification Office's mandate and resourcing to include the promotion of media and information literacy and digital citizenship would build on existing work the office has undertaken. The Safer Online Services and Media Platforms reform process has also raised the possibility a media regulator to carry out some of this work,[358] which includes "educational and awareness initiatives."[137,359]

5.2 The argument for professional learning and development and initial teacher education to include media and information literacy and digital citizenship

Research overseas suggests that teachers' current digital and media and information literacy skills largely match those of the general population, as outlined in Section 1.13. For young people to be taught effectively about polluted information and increase their citizenship skills online, they need teachers with professional digital competence (PDC) as a base, together with specific education and skills to teach media and information literacy and digital citizenship.[360,361] For some teachers, there needs to be a shift in disposition and attitude towards seeing digital and media and information literacy as key parts of teaching.[362] There are two areas where teachers have the potential to develop skills in this area, during ITE see Section 5.3 and through PLD see Section 5.4.[363] There is limited research in New Zealand regarding teacher knowledge of media and information literacy and digital citizenship specifically, but a study in Australia suggests that teachers need educating and high quality resources linked to the curriculum, alongside space in a crowded curriculum to teach these subjects.[364] In order to have a clearer picture of the current skill levels specific to New Zealand, research into graduates of ITE programmes competency in media and information literacy and digital citizenship would be important, as well as those currently in-service. Given the challenges in

measuring these competencies (see Section 6), this would need careful design, and how this might fit into professional standards for teachers.*

Teachers need to know what young people are doing online

In order to support student learning in media and information literacy and digital citizenship, teachers need to know what young people are using the online environment for and how their online engagement hinders or enhances their learning. Young people don't necessarily feel that adults understand what young people are doing or facing online.[365] For instance, if a teacher has never heard of or engaged with Snapchat, how can they conceptualise the issues or privacy breaches that young people may face on the platform? If they don't understand how personalised and targeted TikTok's feed is, how can they discuss the ways algorithms and AI shape what young people see online? And if they don't understand that young people don't make the same differentiation between online and offline that many adults make, how could they understand why young people use the online environment as a key part of their friendship and relationship building? Beyond this, there is a danger that teachers focus on the risks and dangers online without considering the opportunities. This framing can cause young people to disengage from media and information literacy and digital citizenship learning.[366] It is imperative that teachers, and adults generally, are knowledgeable about the platforms young people are using and how these online platforms shape the information young people access. This doesn't mean that they have to use the platforms or have intimate knowledge, but rather that PLD and ITE include content that explores and explains the different platforms and how young people are using them. Specialist teaching in media and information literacy and digital citizenship could support this. Respectful mutual learning between teacher and student could also facilitate both groups to develop their competence in this area, which could also include the use of digital technologies more broadly. See the Case study 4 for more insight into young people's perspectives.

... teachers need to know what young people are using the online environment for and how their online engagement hinders or enhances their learning.

5.3 Initial teacher education: media and information literacy and digital citizenship learning

What could effectively embedding media and information literacy and digital citizenship during ITE look like?

- Much like embedding media and information literacy and digital citizenship across the curriculum, in order to be effective they would also need to be embedded within and across ITE programmes. See Annex 8 for more information on ITE in New Zealand. Media and information literacy and digital citizenship learning in ITE. Teachers have a base

* For example, Teaching Standard 6.5 - Teach and respond to learners in a knowledgeable and adaptive way to progress their learning at an appropriate depth and pace: Teach in ways which enable learners to learn from one another, to collaborate, to self-regulate, and to develop agency over their learning *in both classroom and online learning contexts.*

understanding of the digital/online environment and can use this to inform and shape their teaching.[112]

- Pre-service teachers could be taught media and information literacy across a pre-service programme with multiple opportunities to develop their skills and pedagogical knowledge. The evidence base shows that even a single day of training can make a difference to teachers skills,[367] but that integrated and sustained opportunities to learn throughout ITE are more effective.
- ITE focuses on how to use technology critically in context to enhance teaching.[368]
- Teachers could be given the opportunity to both analyse and produce content, supporting them to understand the environment within which young people are operating.[369]
- Teachers could be supported to understand media and information literacy within cultural contexts, particularly the ways polluted information, racism and discrimination affect young people differently, and take a strengths based approach to young people's learning.
- Teachers would continue to develop their digital and online knowledge as they enter the workforce, keeping up with the changing environment.
- Teachers could be taught the evidence based strategies and pedagogies that promote media and information literacy and digital citizenship, like lateral reading, critical ignoring, and reverse image searching.[10]

Digital skills form an important base for media and information literacy and digital citizenship – how is ITE currently teaching these skills?

Currently, there is little mention of digital skills in ITE programme requirements established by the Teaching Council.[111] Starkey and Yates have made the case for a code or framework to be set out by the Teaching Council relating to digital competence.[111] They note there are only three references to digital competencies in the Teaching Council curriculum documents - two in the requirements for ITE and one in the standards for teaching practice.[111] The first mention outlines that ITE programmes are assessed by the Teaching Council on whether graduates will effectively apply digital technology pedagogies. However, the term digital technology pedagogies is not generally used in the literature and needs to be further defined by the Teaching Council. The second includes technology in a broader list of areas teachers must develop when identifying gaps in their knowledge. The third is in the standard for teaching practice where technologies are included in a list of things teachers should use in response to the needs of learners.[111] Starkey and Yates are critical of the limited preparedness of pre-service teachers for digital learning environments, and outline that a professional digital competence framework could guide initial teaching programmes to adequately equip teachers to be digitally competent. They suggest a framework with three dimensions:

- How to be a member of the teaching profession which includes a responsibility to advocate for young people access and knowledge of digital technology and infrastructure.[111]
- Teaching in a digitally infused context which means being able to apply pedagogical decision-making in a digitally infused context.[111]
- Preparing young people for a digital age both as individuals and within the education system.[111]

Research conducted in the US showed that simply including a single course during ITE, focused on using technology in the classroom, was not an effective mechanism for equipping teachers with lifelong digital skills. They concluded that digital technology must be embedded in pedagogy, and

that modeling from tech savvy teachers during professional placements is needed (see Section 5.4).[370] This will require a shift in our frameworks, acknowledging that teaching for the 21st century is not effective without a depth of understanding about the benefits and challenges of learning in online environments.[361]

Being digitally competent isn't enough when teaching media and information literacy and digital citizenship; teachers need to be able to engage critically with the online environment, including carefully evaluating information that they themselves access online.[371] While Starkey[111,372] and Starkey & Yates[105] offer important insight to the digital skills and competence that teachers receive through ITE, there currently isn't data or research specifically addressing the media and information literacy skills that teachers received during ITE in New Zealand. Media and information literacy is not currently included in the Teaching Council guidelines or curriculum documents which strongly shapes what is (and isn't) delivered by ITE providers. Media and information literacy and digital citizenship are not a priority during training by ITE providers, resulting in teachers likely entering the workforce without the skills they need to deliver a media and information literacy and digital citizenship rich programme to young people.

Research internationally has shown that even when included in the national curriculum, media and information literacy and digital citizenship are not necessarily included effectively in ITE and that there is a large variance depending on the provider of ITE. Even when programmes do include some level of media education, it is mostly focused on how to use media, rather than how media is formed, used, critiqued, and analysed. … in order for media and information literacy and digital citizenship to be taught consistently in ITE in New Zealand it is likely that it would have to be a requirement.

The need for capacity and capability building in ITE within New Zealand

While more explicitly positioning media and information literacy and digital citizenship into the ITE curriculum would be an important step, more resource is likely required to enable ITE to deliver programmes that teach these skills. The ITE sector as a whole, is currently unlikely to have the resources, capacity, or expertise to equip student teachers with the skills needed to deliver media and information literacy and digital citizenship. This is in the context of an estimated 94 ITE programmes (including those for ECE) administered by many different providers who each have different capacity, expertise, knowledge and consistency.[373] This means that there is a need for guidelines, resources, and directives from TEC/Teaching Council if ITE was to include media and information literacy and digital citizenship in ITE programmes. Capacity and capability building is particularly important; equipping the providers of ITE to deliver media and information literacy and digital citizenship would be a vital component of a successful integration of these concepts into programmes.

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5.4 The importance of professional learning and development

What are the key things for success in PLD for media and information literacy and digital citizenship?

If there was a PLD programme for media and information literacy and digital citizenship delivered nationally, aside from a culturally differentiated approach for Māori medium and English medium contexts, there are some key considerations for ensuring the PLD is effective, outlined in Table 16. Teachers also need the time to fully participate in this PLD, alongside many other commitments. Case studies 9, 10, and 11 give some exemplars of approaches to implementing initiatives.

Table 16: The key factors for success in PLD if it were to include media and information literacy and digital citizenship.

Teachers are taught for their stage of learning.	• Just like young people, teachers have different levels of knowledge in terms of media and information literacy and digital citizenship, they need support at all stages (See Section 1.13). • Feeling confident in the use of technology is an important step.[361] • Teachers may have to be taught as learners of media and information literacy and digital citizenship first, before discussion on how to teach it.[360] • Digital focused learning can be a mental barrier for some teachers, they need to be given the ability to overcome this without, being overwhelmed.[360,361] • Teachers' agency and expertise are recognised and respected during PLD, with evidence that when teachers feel that their agency or expertise is not appropriately acknowledged, they can exercise this by rejecting the content of the received professional development.[374]
A whole of teaching staff approach to PLD.	• Every teaching staff member should receive some form of PLD in this area. • Staff members should be encouraged to mentor and teach each other where there is relevant expertise, with appropriate time and resource to do so. • Staff are given time to go to PLD and implement what they learn in the classroom, alongside others in their workplace.[374]
A strong evidence base is key.	• Using evidence based practices when teaching media and information literacy and digital citizenship is important, there are some resources in this space, which are not all underpinned by evidence. See Section 3 for discussion of lesson plans and the research base. • Giving teachers access to resources and research. • Being able to adapt and tailor your teaching to new evidence and challenges, including for specialist areas. • Programmes need to be monitored and evaluated for their effectiveness. • Teachers being included in problem solving and ideas for how PLD may operate in classrooms is key.
Ongoing upskilling and support needs to occur.	• The online environment is constantly changing; there needs to be support for teachers to upskill continually in both formal PLD and non-formal settings. • Sustained support is an important part of PLD's success.[374] • Teachers are going to have questions and things they need to have time to reflect upon which takes longer than formal PLD provides; MoE curriculum leads could have media and information literacy and digital citizenship as part of their mandate.[293]

Lesson plans and practical resources help teachers to sustain the mahi.	• Practical, evidence informed, resources are vital for teachers in the media and information literacy and digital citizenship space. • Having adaptable lesson plans underpinned by a variety of pedagogical approaches is critical. • Enough lessons are needed for teachers to draw on them and adapt from them throughout the year – and for different stages and ages of learning.[293] • Secondary teachers need examples of where media and information literacy and digital citizenship may fit into their specific subject areas.
Sharing and testing ideas with other teachers - more on this is outlined in Section 3.12.	• Having online contact can help sustain what teachers learnt during PLD.[375] • Being able to discuss what works and what hasn't in your class is important. • Support for troubleshooting or difficulties is key.
School culture has an impact.	• A whole of school focus on digital learning means teachers are more likely to take steps to deepen their knowledge and skills in media and information literacy and digital citizenship.[361] • Each school will establish its own local policies and protocols and expectations regarding the teaching and learning of media and information literacy and digital citizenship. However, these need to be based on principles for two conditions: those for effective communities of digital practice, currently largely limited to studies of SEL,[230,376] and those for effective classroom digital instruction, again with a developing evidence base.
Industry standards and evaluation.	• PLD providers need to be evaluated and assessed, ensuring that their programmes are effective. • PLD providers deliver a nationally coherent service, with core ideas and principles delivered in each programme. • MoE supports PLD with universally accessible resources.

Case study 9: MET - supporting schools in all things digital

MET was formed in 2011 and grew from the Manaiakalani cluster of schools in East Auckland before expanding to support other clusters throughout New Zealand.[293,377] The MET partners with communities of learning throughout New Zealand, helping them embrace the pedagogy underpinning The Manaiakalani Programme and supporting them with digital infrastructure and, at times, devices. The focus of MET is on lower socioeconomic communities. The PLD offering includes a programme called the digital fluency intensive, which seeks to equip teachers with the ability to:

- Use the basic tools young people use for learning.
- Use the basic tools for effective teaching, planning, assessment, and professional learning.
- Understand how digital technologies, when used effectively, can accelerate achievement outcomes.
- Understand how to maximise the impact of effective teaching and learning in a digital learning environment.

The intensive PLD occurs over nine sessions and, after the course, offers continuing peer support for teachers to keep in contact with one another, something the PLD team sees as key to teachers having the ongoing support to implement and expand on what they learn during their course. The

Manaiakalani Programme includes support through its Cybersmart Programme that equips teachers with knowledge about digital citizenship, including lesson plans that support them in implementing this knowledge.

One topic included in this programme is SmartMedia which addresses media and information literacy. The resources are drawn from various places, and teachers are encouraged to adapt their lesson plans and send their adapted plans back to the Manaiakalani PLD team so that teachers can see the different ways the content can be adapted for local contexts and what has worked well in other classes. They also offer Manaiakalani Class OnAir, which showcases videos of teachers teaching a lesson to a class and an extended lesson plan; the idea is that seeing a lesson in action can build teachers' confidence and knowledge to implement this in their own class.[43] The MET is relatively small and has a small number of people serving over 120 schools; they are punching above their weight, and there is substantive potential to expand their programme. They identify the need for more resources and lesson plans to support teachers and schools. MET sees the national response to addressing media and information literacy and digital citizenship as vital.

Case study 10: Rotorua Primary School - getting staff and the community on the journey together

Rotorua Primary School is a full primary school in central Rotorua, with a role that is 98% rangatahi Māori.[76] The school has a strong digital focus and is an Apple-distinguished school. Every young person can access a digital device, either provided by the school or through BYOD. Teachers interchangeably use digital devices and more traditional methods in their classrooms, and while some teachers are more confident in this area, every teacher is on a learning journey continually developing their own knowledge and putting it into practice in their classroom.

The school has prioritised the PLD of all staff members, including support staff, to ensure that they know how to use the digital devices in their classrooms and can better integrate them into their lessons. The school highlights the importance of ongoing support, with PLD regularly occurring and an Apple specialist teacher who supports other staff members to utilise Apple technology in the classroom. Rotorua Primary School understands that just like their young people, teachers learn at their own pace, and highlighted the need for different levels of support for different teachers. Every staff member needs support to grow no matter their current comfort level or knowledge base.

The school has a strong cultural focus and connection with young people, whānau and the wider community. This school community has gone on the journey as the school has received Apple accreditation and integrated devices into the school. This has seen some parents go from sceptics to advocates for digital learning. The school is looking into what critical thinking for the online environment would look like, and see critical thinking as a guiding principle for the school as they move more into the media and information literacy and digital citizenship space. Rotorua Primary School acknowledges that more support is needed for other schools to pivot to a greater focus on digital, and there would need to be substantive support and resources to implement a media and information literacy and digital citizenship programme.

Case study 11: Pegasus Bay School - a whole school approach to digital

Pegasus Bay School is a full primary school in Canterbury with young people from years 1-8.[77] Pegasus Bay School is Apple distinguished, and its teachers are Apple certified. Teachers receive PLD through an Apple facilitator and online courses that Apple provides, and the school is taking a whole of school approach, ensuring that every teacher develops their knowledge and digital skills. Every teacher uses a laptop in their lessons and has knowledge about how to use the iPads, and while some teachers have a stronger interest in cutting edge programmes and technology, every teacher is committed to integrating digital devices into their teaching and pedagogy.

Every young person receives a device, and subjects are largely taught on iPads which act as the modern equivalent to their workbooks. Young people develop digital fluency and use digital tools in increasingly complex ways as they move through the school, with opportunities for older young people to extend their learning. The community is on board with the focus on utilising digital devices in learning, and the school sees this a key part of ongoing success. This includes young people uploading videos discussing their learning on a platform for their parents and caregivers to access. The digital skills and fluency that the teachers and young people at Pegasus Bay School have formed enable a strong base into which a media and information literacy programme could be woven.

Case studies 9, 10, and 11 have some key commonalities that are contributing to their success in focusing on digital learning and skills, including aspects outlined at the beginning of Section 5.4 above. But in addition:

- All teachers are being upskilled and equipped to use digital technologies.
- The local school community are included in the initiative and are an enabler to success.
- There is continual development and adaption (using evidence) as the technology changes.
- This provides an enabling platform for a stronger focus on media and information literacy and digital citizenship.

Current PLD for digital technologies, media and information literacy, and digital citizenship in New Zealand

Current evaluations of PLD generally find variability across schools in selection and access, and weaknesses in systematic evaluations of effectiveness.[378] The New Zealand Council for Education Research (NZCER) (2022) survey of perspectives from secondary school teachers showed 22% of teachers strongly agreed that they had the skills and knowledge to provide learning with digital technologies, with 54% agreeing. Similarly, 11% of secondary teachers strongly agreed that they had access to and support from PLD to develop their skills and knowledge in this area, with 38% agreeing.[379] In 2020, NZCER identified "using the affordances of digital tools to create learning experiences that would not otherwise be possible" as one of nine high impact but urgent and challenging foci needed for national PLD.[380]

Even if ITE provides teachers with the skills they need when they enter the workforce, the online environment, platforms, and challenges are rapidly and continually changing, necessitating an ongoing focus on upskilling through PLD. PLD occurs through several avenues in New Zealand, including: networks of expertise, Kāhui Ako | Communities of Learning (CoLs); schools self funding their PLD; regionally allocated programmes, Kahu Pūtoi;[381] and through resources available online from MoE, which teachers can engage in self directed PLD. For more information on these forms of PLD see Annex 9.

Beyond place and funding constraints PLD opportunities are available via the discretion of principals and limited by the availability of substitute staff who can release teachers from their centres and classrooms. PLD must be available, and teachers also need the time to undertake it and implement new learning and ideas in the classroom.

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Could media and information literacy and digital citizenship be included in regionally allocated PLD?

Media and information literacy and digital citizenship could be included as an 8th priority for regionally allocated PLD (See Annex 4 for more on regionally allocated PLD) with schools able to apply for PLD funding in this area. Like digital fluency, this could be in Māori medium, kura kaupapa, and English medium schools. However, simply adding this as a learning priority would not address the need to deliver this on a school wide and nationwide level, if the current constraints in the number of spaces of regionally allocated PLD remain.

One option would be expanding regionally allocated PLD with a specific allocation of PLD to media and information literacy and digital citizenship. Using regionally allocated PLD as the mechanism to deliver PLD focused on media and information literacy and digital citizenship would still allow a degree of autonomy for schools to choose their provider and a programme tailored to the needs of the school, with the PLD panel ensuring that the PLD meet the requirements. The process would have to allow for continual development in media and information literacy and digital citizenship year on year, with teachers able to receive some form of ongoing support.

Nationwide PLD for media and information literacy and digital citizenship?

Another option is to deliver media and information literacy and digital citizenship PLD on a nationwide scale, ensuring that every school has access. The MoE has previously invested in Kia Takatū ā Matihiko | the Digital Readiness programme, which sought to prepare schools for the changes to the technology areas of the curriculum in 2017.[382] This programme ran from 2017-2020 and was mainly delivered online with some webinars and face to face training[382] and could provide a model for nationwide delivery of media and information literacy and digital citizenship PLD. The programme was evaluated by NZCER; some of the key strengths found were: its bicultural foundation; delivery by programme partners with different strengths and expertise; the use of codesign practices; and delivering and reviewing the programme in six monthly phases, allowing for the programme to adapt and change.[383] However, the evaluation also highlighted challenges including:

- The need for sustainable support for kura and schools at different starting points.
- That the three year timeframe is likely too short, with a need for a reduced form of ongoing support for later adopters.
- The need to draw more on existing research showing effective PLD practices, including that whole of school PLD supported by school leaders is more effective.
- The need to gather timely information about the current capabilities of schools and kura, including barriers and factor these into the planning of the programmes.
- Online modes won't meet everyone's need; mixed modes including high quality face to face and technical support are also needed.

This evaluation gives important lessons to consider if implementing a national PLD programme for media and information literacy and digital citizenship. One significant benefit of an online platform being used to deliver media and information literacy and digital citizenship PLD is the potential for wider reach, although this needs to be balanced with face to face PLD. There is also a need for ongoing support so educators can continue to develop their knowledge and implement it.[255,293] There is an opportunity for ongoing contact on social media and online, with teachers sharing ideas and learnings for peer to peer support and development of their teaching practice.[375]

CoLs as a potential mode of delivery

CoLs were one part of the Investing in Educational Success (IES) initiative established in 2014.[384] They are groups of schools, kura, and ELS that were intended to raise young people's achievement by transferring expertise between teachers and schools.[385] As of 2019, there were 221 CoLs, with providers participating or moving between existing communities.[386] In 2017, MoE used CoLs as one pathway to integrate the new digital technologies curriculum.[387] CoLs are a potential mode of delivery to support PLD focused on media and information literacy and digital citizenship within and across school clusters.

There is limited evidence of the effectiveness of CoLs in the broad sense.[388] Teacher experiences of CoLs vary significantly, and can be dependent on the individual teacher, the within school and across school leadership, as well as the culture of individual CoLs. However, there is some support from the teaching community for the collaborative practice that CoLs makes accessible.[389,390] As a community that shares expertise and capability, each CoL seeks to work collaboratively, working alongside each other. When CoLs are successfully built on a foundation of trust, reciprocity, and collaborative leadership the conditions are created for reflective professional learning and inquiry.[391] However, it can take time for these conditions to occur.[389] Each CoL is different, and some may be better placed to provide effective PLD to their teachers. One significant positive associated with CoLs is that they include providers that deliver education across a young person's life course. Media and information literacy and digital citizenship needs foundational skills that start in early childhood right through to young adulthood and beyond. Not all schools are involved in CoLs or able to join one, and as of 2021 only 73% of schools and kura* were part of a CoLs.[238,392]

One example of a community of schools that are effectively sharing best practice and collaborating is the Manaiakalani community of learners (see Case study 9), which now supports 13 other CoLs to

* Composition of schools within a CoL as published by the MoE in 2021.[217] The number of schools and kura (full primary to secondary including state, state-integrated, and private) as published by Education Counts 2023.[348]

embrace their 'Learn, Create, Share' pedagogy and the digital infrastructure and support as part of the Manaiakalani Network.[393]

5.5 Libraries can be an important part of the media and information literacy and digital citizenship system

Libraries are another important site that has the potential to support national uptake. Librarians are information literacy experts and could act as part of the wider media and information literacy and digital citizenship system,[394] as is seen in Finland (Section 2). Collaboration between teachers and librarians in promoting media and information literacy and digital citizenship has seen positive outcomes for young people's skills.[395] There are two main types of librarians that work directly with young people: school librarians based inside a school and public librarians who are based in libraries open to the general public. In New Zealand, many schools and kura rely on their school libraries and librarians for library services, with varying degrees of relationship between schools and their local public library.

Schools don't receive direct funding for libraries, rather it is allocated from a wider pool of funding the school receives. Some schools, particularly primary schools, have teachers with the library responsibility role.[396] The hours that a school librarian works are highly variable, with some part time, some having other jobs, and some full time. There is a sense that the job is undervalued and underutilised, with schools and teachers often not understanding the importance of librarians' roles.[396] A 2017 survey in New Zealand found that both secondary school teachers and school librarians don't see librarians as centrally involved in the information literacy skills of young people[397] and found that the collaboration between these groups is lacking.[397] It is clear that the current system is not utilising librarians to support wider media and information literacy and digital citizenship and that stronger partnership may improve outcomes for all. There is an opportunity in New Zealand to strengthen the role that libraries play as partners in tackling the polluted information landscape, with the National Library well placed to play a leading role.

Our library workforce backgrounds are diverse. In the 2022 school library survey conducted by the National Library, 11% of respondents had no qualification, 27% had a certificate or diploma in Library and Information Studies (LIS), others had qualifications in other subject areas, and some had postgraduate qualification in library and information studies. [396] This wide variance presents some challenges for librarians to support media and information literacy and digital citizenship, but presents opportunities to upskill staff. In Australia, there is accredited librarian training in media literacy.[398] In New Zealand, the National Library's Services to Schools also offers a range of professional development and support for school librarians, and has run online courses and face to face events focused on developing digital literacy in schools with the library as a nexus for this.[399-401] Part of the National Library's role is to supplement and further the work of New Zealand libraries, including promoting cooperation in library matters. As well as providing PLD to school librarians, teachers, and some public librarians, the National Library is able to provide a coordinating role across the library sector and support and promote government responses through these channels.

A pilot programme that occurred in New Zealand, providing training for school librarians to deliver an information literacy programme, was run by Tohatoha see Case study 12. There is potential for librarians to be offered PLD to develop their media and information literacy and digital citizenship skills, and for them to act as a hub or centre of knowledge in this area. There is potential to utilise

targeted PLD or programmes to support librarians to facilitate upskilling in media and information literacy and digital citizenship.

Case study 12: Tohatoha – equipping librarians in schools

Tohatoha is an incorporated society that has worked in the information literacy (a term they use that overlaps with media and information literacy) space, equipping school librarians and co-delivering an information literacy pilot titled 'A Bit Sus' to 38 schools.[255] Tohatoha believes that librarians are a vital part of the information literacy landscape and have the potential to offer expert knowledge in this area when they are given support and the tools to do so. The programme draws from the Stanford History Education Group curriculum and research that tackles information literacy using two main techniques, lateral reading, and inoculation theory, using examples that seek to connect to young people's day to day lives online.

Tohatoha offered their cohorts continued support beyond the initial PLD and codelivery through messaging and online groups, where librarians could troubleshoot, discuss their successes, and identify challenges. They believe peer support after the programme ends is a key part of its ongoing success.[255] Tohatoha outlined the importance of research informed programmes in this space, with a continual process of developing interventions, delivering the programme, evaluating, revising then repeating all these steps.[402] This is particularly important with the rapid pace at which the online environment changes. The pilot, in its second iteration, produced an escape room activity that addressed issues such as misleading data, deep fake images and videos and social media bots, and supported librarians to deliver the escape room to their school. The idea was that the escape room connected with young people's real world experience of the online environment.[252] Tohatoha has evaluated this pilot programme, showing that librarians were using the knowledge they had gathered from the programme and many had plans to continue it. The evaluation identified the need for research into how best to evaluate the impact of the programme on young people's online behaviours and the effectiveness of this over time.[403] Unfortunately, due to a lack of funding, Tohatoha is currently not conducting this programme.

What could public libraries and schools working together look like?

The library in the city of Lahti Finland supports schools, teachers and young people with media and information literacy (see the country analysis on Finland in Section 2.1). In a New Zealand context, the National Library could establish a network model of library services for young people involving public libraries, school libraries and National Library. This is in recognition of the National Library's role in supporting and supplementing school library services, promoting cooperation in library matters and assisting in the development of libraries.[404]

Rotorua Primary School recently closed its school library giving all the books to families and young people. The school now has a strong relationship with the central public library, using this space for lessons and taking their young people to get books from there.[76] Part of the reason for this relationship between school and library working so well is due to the close proximity, classes only have to walk a few hundred metres. Such partnerships are more challenging in schools that are not near a public library. However, strong relationships like this are a key foundation for libraries and schools working together to promote media and information literacy and digital citizenship. There is

potential for both greater support for media and information literacy and digital citizenship within school libraries and for a stronger collaboration between public libraries and schools seeking to promote media and information literacy and digital citizenship. In both these options librarians would need support and training to make this happen.

There is potential for both greater support for media and information literacy and digital citizenship within school libraries and for a stronger collaboration between public libraries and schools seeking to promote media and information literacy and digital citizenship.

Key takeaways:

A government body given the mandate to promote media and information literacy and digital citizenship could build cohesion:

- A government body has the legislative authority to promote media and information literacy, provides a coordinating role and a central place for resources.
- The government body could coordinate a media and information literacy week, seeking to promote media and information literacy and digital citizenship to the general public as well as supporting schools, teachers, parents and young people.
- In other countries, the government bodies responsible are the equivalent to Te Mana Whakaatu The Classification Office in New Zealand.
- A national plan/strategy for media and information literacy and digital citizenship is useful to coordinate development and roll out.

Teachers must be well equipped through PLD and ITE:

- Teachers currently have varying degrees of digital fluency. As digital fluency is a foundational component of media and information literacy and digital citizenship, there needs to be development of digital fluency of teachers in order for them to deliver media and information literacy and digital citizenship.
- Teachers need to understand what young people are doing online.
- PLD is needed for teachers to acquire the pedagogical and content knowledge to deliver media and information literacy and digital citizenship education.
- ITE needs to include media and information literacy and digital citizenship in its core curriculum; capacity needs to be built so that providers can deliver this in their programmes.

Libraries are a key part of the system:

- With training and support, libraries (both public and school) can be another site for support for teachers and schools.
- They run media and information literacy and digital citizenship programmes and activities for young people and whānau.
- The National Library well placed to play a leading role.

6. Tracking the progress of media and information literacy and digital citizenship: assessment and policy levers

A vital part of implementing a media and information literacy and digital citizenship programme is tracking the progress made and the outcomes expected of the programme. A challenge in assessment is that there currently isn't a unified framework or set of indicators that enable teachers to identify what media and information literacy and digital citizenship competence looks like.[146,405] Whatever form assessment takes, it will be an important tool for better understanding young people's needs and what responses are required. Programmes, interventions, and lessons should be formed around an evidence base, ensuring those things that are implemented positively impact young people's progress. Where appropriate, programmes, interventions and lessons should be evaluated for their effectiveness, with an ongoing process of refinement. This progress needs to be supported at three levels: in the classroom, in the school, and nationwide see Table 17.

…there currently isn't a unified framework or set of indicators that enable teachers to identify what media and information literacy and digital citizenship competence looks like.

Table 17: The three levels of tracking progress.

Level	
In the classroom.	• Ensuring that teachers have tools to track young people's learning and progression, including the development of young people's media and information literacy and digital citizenship knowledge, skills, and dispositions. • Ensuring that teachers have the knowledge and skills to teach media and information literacy and digital citizenship.
In the school, kura, or ELS.	• Tools and measures for tracking learning at a school/kura/ELS level, ensuring consistency and coherence across classrooms. • Tools and measures for tracking teacher's uptake of media and information literacy and digital citizenship related PLD opportunities and developing competency.
Nationwide.	• Monitoring progress across schools, regions, and nationally. System level monitoring of child media and information literacy and digital citizenship skills and the impact of implementing a media and information literacy or digital citizenship programme. • Monitoring national uptake of resources and PLD to support teachers' skills and knowledge, and their effectiveness.

What are we trying to ascertain for digital citizenship and media and information literacy?
Basic dispositions and skills underpin digital citizenship, including digital literacy, digital skills, and digital readiness, for which standards are starting to emerge.[406] Socio emotional skills can be ascertained using well known rating scales of social and emotional constructs. These include:

- Emotional, behavioural, and cognitive regulation.
- Attention focus and response inhibition.
- Sociability and prosocial skills.
- Empathy skills.
- Personality traits such as 'conscientiousness' and 'agreeableness'.

Research and diagnostic tools to assess these constructs in young people on an individual level include the Big Five Inventory (BFI), and the Strengths and Difficulties Questionnaire (SDQ) (sub scales of the latter being used in some current health surveys, including the B4School Check). Revised versions of these basic measures for digital contexts have been developed for research purposes with acceptable psychometric properties.[407] However, there is some evidence of sensitivity to context and that the skills have different properties in digital contexts.[407] Adapting the BFI or SDQ for online context could be used by researchers and evaluators as a tool as a starting point to develop and test the efficacy of classroom resources and programmes.

The dispositions, and skills that BFI and SDQ seek to measure also contribute to young people's real world interactions and experiences. A focus on measuring these is needed, especially at the whole school and national level. Purpose built assessment within classroom, to evaluate the effectiveness of locally designed activities and teaching are possible. The following real world examples of both positive and negative ways of acting and being online closely align with digital citizenship, some of which are currently, or could be, assessed with existing tools:

a. Cyberbullying and other online interpersonal misuses.
b. Online collaboration (e.g., collaborative problem solving, collaborative reasoning).
c. Distractibility in complex online activities (e.g., school related activities, 'serious' games).
d. Obsessive or addictive levels of online use (e.g., gaming or social media use).
e. Active (positive) engagement with online communities including vulnerable communities.
f. Respect of others online, including those that share different viewpoints.
g. Understanding of digital and online safety, and how to operate online in a safe and age appropriate manner.
h. Knowledge of the rights of privacy as an individual and respect of others' rights too.

Similarly, there are basic dispositions and skills which underlie real world (meaningful) expressions of media and information literacy. These are present in constructs such as critical thinking, critical reasoning, and meta-cognition.[101] The evidence indicates considerable 'domain specificity', meaning the basic dispositions and skills develop relatively independently in different domains of learning, such as different subject areas. Capability specific to different contexts is needed; just having high achievement in school related subjects does not guarantee high levels of media and information literacy.[330] However, high levels of the dispositions and skills are related to higher levels of measured comprehension.[39,100] Below are some of the broad dispositions and skills needed across learning areas:

i. Questioning the content creator's intent, perspective, and potential bias and how this may shape the content they produce.
j. Knowledge of what makes a trustworthy source or piece of information trustworthy or untrustworthy, including skills like lateral reading and critical ignoring.
k. Reflecting on one's own intent, perspective, and bias and how this may differ from others online, and peers.
l. Ability to use media and information literacy skills across platforms and contexts (e.g., a young person can evaluate an academic resource when producing an assignment but can also evaluate a video on TikTok).

Further to these dispositions; and skills there is also another key component to consider, teachers' capability.

m. Teachers' own media and information literacy and digital citizenship skills.
n. Teachers' ability to teach young people media and information literacy and digital citizenship skills.

School environment is also important, with school leadership including principals and other school leaders a vital part of this:

o. School environment, including school leadership for fostering media and information literacy and digital citizenship.

Capitalising and building on existing tools

The current monitoring mechanisms, those that could be adapted to monitor, and those that could be formed for media and information literacy and digital citizenship, are outlined in Table 18.

Overall, there are opportunities, although piecemeal, currently available to track national and international assessments that could provide measures of outcomes and success. However, there is an opportunity and need for more direct and explicit foci, either through incorporating new aspects to current mechanisms or through establishing new mechanisms altogether. Beyond simply tracking young people's progress in media and information literacy and digital citizenship skills, it is also important to consider the policy levers that can be leveraged to support progression. Table 19 summarises these, as well as the skills, dispositions, and attitudes, they may support. The policy levers, if used together, have the potential to positively impact the media and information literacy and digital citizenship concepts that may be assessed, as well as teachers, principals, and leaders' own competencies.

… there are opportunities, although piecemeal, currently available to track national and international assessments that could provide measures of outcomes and success.

Table 18: Monitoring mechanisms for media and information literacy and digital citizenship.

Monitoring mechanism	Description	What is it assessing/ what could it assess?	At what level
Whataboutme? Survey.[44]	Whataboutme? Survey was conducted by Maltest International with funding from MSD. The survey includes some questions regarding access to social media, its importance in their life, worries about their use and whether they feel safe online. It also includes questions regarding online bullying and a question about whether young people have been pressured to do things they or someone saw in pornography.	The survey includes some questions relating to a, d, e, f & g.	Nationwide monitoring.
PISA survey.[39,45]	The PISA survey offers an opportunity for some tracking of media and information literacy and digital citizenship skills, as it has recently increased the focus on these skills with comprehension items assessing how well young people evaluate the credibility of a writer's arguments, recognise an author's point of view or biases, and judge the reliability of sources in Reading literacy.[39] NZ has recommended a special additional section on media and information literacy in the next round of PISA.	Includes some aspects of a, b, i & j. If the recommendation from NZ of an additional section on media and information literacy was included then could also include i, k & l.	Nationwide monitoring (in international context).
National Monitoring Study of Student Achievement (NMSSA) and Curriculum Insights and Progress Study.[408]	A large scale assessment that monitors trends in student achievement. Working with more than 5,000 young people a year, it is a collaboration between the University of Otago, NZCER, and MoE. NMSSA currently has a limited emphasis on media and information literacy in different subject areas. But with the redesign to reflect the curriculum refresh, there is the opportunity to have a more deliberate and explicit focus.	Includes some elements of b and could include i, j, k & l.	Nationwide monitoring.
Media and information literacy and digital citizenship specific nationwide monitoring.	Another option is creating a media and information literacy and digital citizenship specific monitoring system. There are a range of options for how this could occur, ranging from an online assessment and data base, the likes of which is seen in Finland with Save the Children's Huippula (See Case study 13)[409,410] The data is also collected at a school level, as well as regionally and nationally. Giving a baseline for young people capabilities at age 11.	Whichever concepts are included in the assessment/monitoring.	Nationwide and school monitoring
International teaching and learning survey (TALIS) -	The international TALIS is conducted by the OECD and surveys teachers and principals regarding a range of aspects of teaching. There is some inclusion of whether teachers have received ICT training in the last 12 months, as well as	This includes some aspects of m, n & o.	National level monitoring (in the context of

teachers and principals ECE – Year 10.[411]	whether they give young people tasks that require critical thinking and include ICT.		international monitoring).
Teachers' capability assessment or survey.	There is potential to create a teacher survey. A survey could ask questions about teachers' attitudes to online behaviour and confidence in teaching media and information literacy and digital citizenship. There is also potential to assess teachers' capability during ITE through a formal or informal assessment or/and to utilise assessment before and after PLD to see if teachers' capabilities have improved as a result of this development.	This would assess m and n and has the potential to assess o if principals and school leaders where included.	School/kura/ELC level, but also nationwide.
National Certificate of Educational Achievement (NCEA) standards and assessment.	There is potential to assess media and information literacy skills through a NCEA standard and assessment. There are currently some achievement standards that include concepts related to media and information literacy, these include assessments in English, social studies, media studies, science, and history.[412-417] Many of these standards are focused on some aspects of media and information literacy, rather than a full suite of skills. There are two unit standards, where young people can only receive an achieved mark, that specifically address concepts relating to media and information literacy.[418,419]	Current assessment includes concepts relating to i and j, but has potential to include concepts relating to k & l.	Classroom, school/kura/ level and national monitoring.
e-Learning Planning Framework (e-LPF) and Māori-medium e-LPF (Te Rangitukutuku).[420]	The e-Learning Planning Framework (e-LPF) and Māori medium e-LPF (Te Rangitukutuku) are tools to help schools and teachers reflect on, and evaluate, their e-learning capability. The e-LPF is intended to support regular self review and subsequent improvement of e-learning skills and knowledge, in ways that reflect our bicultural heritage within a multicultural context.	These tools have been developed to reflect on and evaluate e-learning capability. This includes some aspects of m, n & o.	School/kura/ELS level.
National Wellbeing@school survey.[421]	The National Wellbeing@school survey is a toolkit that schools can use to self review. It explores how different aspects of school life contribute to creating a safe and caring climate, with a particular focus on deterring bullying. The survey toolkit has the potential to include questions that relate to the online environment and online bullying and behaviours.	Could include a, b, e & f.	School/kura/ELS level.
Progress and Achievement Tests (PAT)[422] and Electronic Assessment Tools for	PAT and e-asTTle currently do not include specific mention of media and information literacy or digital citizenship concepts in their tests relating to reading, writing, and mathematics. These tools are potentially able to be updated and current work in NZCER with PAT could be used to increase the focus on media and information literacy.	These could include the media and information literacy concepts: i, j, k & l.	Classroom and school/kura/ELS

Teaching and Learning (e-asTTle).[423]			
The Progress and Consistency Tool (PaCT).[424]	These offer ways for teachers to track young people learning in combination with learning progression frameworks (LPFs). There are no specific items in current reading, writing and maths LPFs and PaCTs that address media and information literacy and digital citizenship.	These could include the media and information literacy concepts: i, j, k & l.	Classroom and school/kura/ELS.
System measure for start of schooling School Entry Kete.[425]	The School Entry Kete was developed by MoE, to assess young people's skills and knowledge as they entered schooling. This had a component focused on social and emotional skills including self regulation, but further trialling and development has not occurred since 2022. There is potential if this was further developed and trialling that it could include more of the foundational skills associated with digital citizenship and media and information literacy.	More likely to focus on foundational skills rather than specific things outlined.	Classroom and school/kura/ELS level monitoring.

Case study 13: Huippula – a gamified assessment that supports both teachers and young people

Save the Children Finland in collaboration with Google.org have produced a programme Huippula, with a loose translation of PeakVille in English.[409] Huippula is a gamified and storified test, that produces class, school, and district level data sets highlighting the competencies of young people. The programme is aimed at 10-12 year olds and assesses the digital safety and wellbeing competencies of young people. Save the Children intends for the programme to reach 60,000 5th graders in Finland, developing their and their teachers' competencies, and to provide a national data set indicating the level of young people's competencies at the 5th grade (year 7) level.
There are four areas tested:

- Balanced online life – focused on digital wellbeing and how much time young people are spending online.
- Participation and interaction online – focused on how young people are treating others online.
- Safety and safety skills – focused on information security and potential risks online.
- Critical media and information literacy – focused on digital footprints and how to distinguish reliable and unreliable information online.

The test and other resources are made so teachers can deliver it in a single lesson. The 10-12 year old age group was chosen as from this age onwards it is relatively common for young people to have public facing social media accounts. This gives teachers time to respond before most young people are fully immersed in social media content online. To help with this response, the platform gives teachers an individual class report with anonymised individual student data, followed by lesson plans that are relevant to areas in which the class hasn't performed well. These followup lessons further strengthen young people's knowledge and grow their digital and media and information literacy competence. If there are responses that raise red flags, the teacher will get an alert to cover the topic in the class, along with the resources to support this. There is significant opportunity for data collection at a national level to give a snapshot of how young people are tracking, and Save the Children is focused on getting as many 5th graders as possible to take the test in Finland, building a national data set that the government can use to guide their media education policy.

Table 19: Policy levers to support media and information literacy and digital citizenship.

Policy Lever	Description	What areas would these levers support
Assessment and progress tools for schools/kura/ELS.	Implementing a set of progress tools and assessments that schools can use, specifically for media and information literacy and digital citizenship skills. These might take the form of testing young people's ability to analyse sources of information, or screen their attitudes and behaviours associated with digital citizenship, e.g., time spent online, or whether they have faced bullying online. It may also involve giving teachers tools and rubrics to measure expected progress without formal assessment, and ways to support young people to continue progressing.	Whatever areas that are included in the tools and assessment, it is likely that the digital citizenship skills: a, b, c, d, e, f, g & h as well as the media and information literacy skills: I, j, k & l will be covered.
Workforce capability through ITE and PLD.	Teachers need to have the skills to teach their young people media and information literacy and digital citizenship. There are two aspects of this, expanding their own media and information literacy and digital citizenship and ensuring they have specific pedagogical knowledge about how to teach young people media and information literacy and digital citizenship. The current workforce policy work (which includes establishing a Ministerial Advisory Group) could provide a means to increase focus through ITE and PLD. Media and information literacy and digital citizenship could be part of ITE with a need for capacity and capability building if this occurred. Media and information literacy and digital citizenship could also be a part of PLD, with a whole of school approach likely needed to ensure that each teacher has the skills to teach in this area. The need to build workforce capability is explained in more detail in Section 5.	This lever would support m and n, and likely would support o. Would have flow on impacts for the digital citizenship and media and information literacy areas.
Positive Behaviour for Learning (PB4L).[242]	PB4L aims to improve the behaviour and wellbeing of children and young people through a range of tools. These could be redesigned to include concepts more closely relevant to digital citizenship and media and information literacy.	This lever could support, with a pivot to a greater focus to the online environment, those skills associated with digital citizenship: a, b, c, d, e & f.
Curriculum.	There are places in the curriculum where media and information literacy and digital citizenship could be more explicitly embedded, and the report. Section 4 outlines the importance of embedding complete concepts of media and	This lever could support both the digital citizenship skills: a, b, c, d, e, f, g & h and the media and information literacy skills: i, j, k & l.

	information literacy and digital citizenship across learning areas. The Literacy & Communication and Maths Strategy, released by the MoE as part of the wider curriculum refresh, has aspects of media and information literacy integrated, but not digital citizenship.[149]	
Production of resources and lesson plans to support teachers.	Ensuring that there are lesson plans and resources available for teachers to use and adapt, that are underpinned by a strong evidence base. This supports teachers to integrate media and information literacy and digital citizenship into their teaching, including those who may not be as confident. See Section 3 for a more detailed review of the importance of resources.	This lever would support the areas focused on in the resource or lesson plans. Lesson plans and resources covering all the media and information literacy and digital citizenship areas would be helpful.
Production of PLD and resources to support principals and leaders.	Ensuring that principals and leaders have the skills to implement media and information literacy and digital citizenship and support their teachers to also do so.	This lever would support o with flow on effects for m & n.
Supporting evaluation.	Providing resourcing to allow specific evaluation of the impact of these programmes, lesson plans, and interventions would be helpful, particularly for new programmes, lesson plans, and interventions that arise.	This lever would impact all areas, supporting the effectiveness of programmes, lesson plans, and interventions.

Key takeaways:

Assessment and tracking progress is a key part of ensuring young people develop and gain skills.

- This needs to occur on a classroom, school, and national level.
- There are current mechanisms, although piecemeal, that allow for tracking of media and information literacy and digital citizenship.
- There is an opportunity to expand current mechanisms or introduce new ones to track media and information literacy and digital citizenship at the three levels.

There are a range of policy leavers to support media and information literacy and digital citizenship including:

- Assessment and progress tools for schools, kura, and ELS.
- Building workforce capacity through ITE and PLD.
- Explicitly embedding media and information literacy and digital citizenship across the curricula.
- Expanding Positive Behaviour for Learning (PB4L) to include media and information literacy and digital citizenship concepts.
- Production of resources and lesson plans to support teachers.
- Production of PLD and resources to support principals and leaders.
- Supporting evaluation of programmes.

7. Beyond the classroom: communities, parents, caregivers, and whānau

Parents, caregivers, and whānau play a vital role in equipping young people to acquire media and information literacy and digital citizenship skills. However, parents and communities are part of a population at risk of online harm.[61] Much like teachers, many adults, who seek to support young people are not well equipped with the necessary and ever changing media and information literacy and digital citizenship knowledge and skills themselves.[106,426] The base level of an adults own digital competence and specific media and information literacy skills varies significantly depending on the adult's age, access, life situation, computer literacy and media skills.[427,428] Interventions and support need to consider and cater for these differences.[429] Adults need support to build their own media and information literacy and digital citizenship knowledge and skills while giving them tools and strategies to support young people.

Adults need support to build their own media and information literacy and digital citizenship knowledge and skills while giving them tools and strategies to support young people.

Research into parents' attitudes in New Zealand shows that many take an interest in what their young people are watching and seeing online, although they might feel ill equipped to discuss these topics or know what to do to support their young people.[102] Young people in New Zealand report that in most instances being able to talk about distressing media content makes them feel better.[430] Giving parents the resources and knowledge to have discussions about content and support young people is vital.[431]

Much like young people, there are specific topics and techniques that would be helpful for parents to understand. Access to libraries (Section 5.5) and a central online repository that adults could access would be a helpful resource and could include explainers and support for parents and wider whānau. It is essential that parents and families are included in media and information literacy and digital citizenship within the school environment. There is some research that shows media and information literacy and digital citizenship skills of young people are stronger when techniques were shown and discussions were had in both the school and home environment.[432] This highlights the importance of partnering with parents and whānau as part of media and information literacy and digital citizenship education.

7.1 Adults are not immune

We know that adults aren't immune to polluted information and often may be less equipped with information literacy and digital skills than young people (see Case study 14). Research shows that older adults have a particular vulnerability to polluted information.[433] Giving them the knowledge and skills to support young people, therefore, has the potential to have a positive impact on their media and information literacy and digital citizenship skills too. There is a body of evidence that suggests there is potential to grow adults' resilience to polluted information.[433,434] For many adults, this means covering similar concepts to media and information literacy and digital citizenship that young people are taught, including what polluted information is, how to spot bias in content, what

algorithms are and how they shape what we see online.[434] Research into the efficacy of the MediaWise for Seniors intervention, which occurred during the 2020 presidential election in the US, showed that older people had an improved ability to classify what information was false and accurate after the intervention. The intervention used including click restraint, lateral reading, reverse image search, and instruction on search engine filters.[433] Although just one example, this highlights the value in including adults in media and information literacy and digital citizenship by producing programmes and resources. These tools (see Section 3.2) could be explored in the New Zealand context.

Research shows that older adults have a particular vulnerability to polluted information.

Case study 14: Birds Aren't Real - tackling polluted information with the absurd

Birds Aren't Real is a Gen-Z satirical conspiracy theory that all the birds in the US are drones. It was started by Peter MacIndoe in 2017.[435] The theory outlines that every bird was massacred by the government and replaced by drones to spy on the American public. The Birds Aren't Real community attends protests and shares videos and photos online. Unlike other conspiracy movements, the followers of the movement know that it isn't true. The purpose of the movement is to highlight polluted information, poke fun at the absurdity of many conspiracy theories, and ultimately spark a discussion about the things we see and sometimes believe online.

The movement sought to build credibility, hiring an actor to play an ex-CIA agent confessing to the conspiracy, confirming bird drone surveillance, and creating a history of the movement tracking back to when birds were removed from the sky in the 1970s. Birds Aren't Real has some of the hallmarks of other conspiracy theories, for example government collusion and a mass cover-up, but pushes these things to the extreme and the absurd. As one of the members there from the beginning, Connor Gaydos, outlines, "If anyone believes birds aren't real, we're the last of their concerns because then there's probably no conspiracy they don't believe." But there are those that do. Some outside the organisation believe the conspiracy, with a local news outlet even reporting on the conspiracy as fact. The movement and the content, much of which has gone viral on social media, especially TikTok, is aimed at ensuring people question what they see online when the information seems more credible than Birds Aren't Real.

Birds Aren't Real, while satire, highlights some important lessons when understanding polluted information. Some people have such significant mistrust in institutions and the government that they are primed to believe scenarios that support this bias. It isn't simply enough to present other information, especially for those with deeply ingrained and held beliefs. The website and movement highlight how easy it is to make things up and present them as evidence. The Birds Aren't Real movement had an actor play an expert claiming to have evidence to back up the movement and wrote a fake history of the movement, both things that add perceived credibility and that other people and movements can do online. The Birds Aren't Real movement highlights the importance of equipping young people, and adults, with media and information literacy and digital citizenship skills to navigate and dismiss polluted information. Peter McIndoe reflects on the way that protestors are treated, and how this treatment reinforces the sense of community within

the activist group[436] providing insights upon which to further research methods to pre-bunk conspiracy theories.

The skill level of adults varies

Research, interventions, and programmes relating to media and information literacy and digital citizenship have largely been targeted at young people and failed to adequately include adults and older people.[429] Broadly, different age groups use the internet in different ways, but this knowledge has led to older people having less focus on their content creation and their ability to understand online content, doing a disservice to their potential to harness or understand this aspect of the online environment.[437]

The Australian Media Literacy Alliance has already identified priority groups and those groups that would encounter barriers to media and information literacy:[438]

- People living in low income households.
- People with a low level of education.
- People living with a disability.
- People living in regional areas.
- Older people.
- Indigenous peoples.

Like Australia, in New Zealand there are some groups that are likely to be more vulnerable to digital exclusion, as identified by the Motu report commissioned by the Department of Internal Affairs. These groups include Māori, Pacific peoples, disabled people, people in social housing, seniors, un- and under-employed, and remote communities.[439] People with disabilities and those living in social housing were identified as particularly vulnerable. Immigrant communities are likely to need tailored and targeted resources. When considering implementing media and information literacy and digital citizenship in New Zealand, there needs to be particular consideration for these groups. It is not only important to consider what these communities' unique needs may be, but for these groups to codesign and lead the formation of resources and projects.

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Some countries require promotion of media and information literacy for all age groups

In the EU, member states are required to support media and information literacy of all citizens, and to report back to the commission every three years.[440] Parents and whānau need access to resources and information about different topics relevant to young people online. Resources include practical and evidence-based discussions would be a helpful tool that a government body in New Zealand could provide. In Finland, KAVI (see Section 2.1), has the responsibility to promote media and information literacy to the wider public, not just young people.[137,353] These resources cover topics like what media is, how age ratings work, the benefits of media, social media, and critical media literacy, while giving different talking points to start the conversation with a family's young person or

people that are appropriate for different ages.[441] These resources are helpful tools that could be promoted in schools and other community groups as a valuable resource.

If New Zealand were to have a government body, such as those discussed in Section 5.1, that was tasked with promoting media and information literacy, support for parents and whānau would be an important part of their work. There are resources produced specifically to support parents, caregivers, and whānau in how to discuss and traverse the topic of media and information literacy.

7.2 Community and cultural identity offline can be protective factors online

Young people's identity and familial and cultural connections are all important protective factors for navigating the online environment. Building this sense of identity can occur offline or online, or often a combination of both. The principles, values, and support that young people receive from their community and whānau are an important base, but belonging is a vital part of this too.[144] An example of this was highlighted during a kōrero at Te Kura Māori o Nga Tapuwae, see Case study 15. When asked about how their young people navigate polluted information that is racist and inaccurate in its portrayal on social media or in the media more generally, Principal Arihia Stirling outlined that ākonga don't pay attention or give this any oxygen because they know who they are and their foundation is in their culture.[442] In this sense, a deep connection to community and positive cultural identity can help with critically ignoring some types of polluted information. There are strong cultural understandings and ideas that resonate with, and support, many Māori; whanaungatanga, the process of establishing family-like relationships and strengthening kin and wider community ties, is an important part of this.[28] Another idea is that individuals are not alone but rather connected to their ancestors from the past, present and future, making their identity much broader than their immediate circumstances or whānau.[28] Broadly, there is research showing that connection to cultural identity promotes wellbeing.[138,443,444] This is further explored in Case study 15.

While the examples above discuss principles that may resonate with Māori in particular, the ability to draw from your community and culture extends to every young person. The evidence shows that rich offline experiences that connect young people with the wider world, their family, and new people are important for mental health and wellbeing and building interpersonal competencies.[445]

Beyond the risks (Section 1.12) for many young people, the online environment is a space where they can express their identity and feel secure, while the home environment may not be. This can be because they aren't able to express their full identity, or because they don't experience support around them offline. This is especially true for LGBTQI+ young people, who may turn to social media as a refuge and place of belonging.[446,447] Many minority groups may use social media to connect with people who have shared identity; immigrants can make connections with those geographically distant but with shared values and culture; for immigrants, the online environment may be one of few ways to connect with people with the same cultural identity and who understand this aspect of their being.[448] Parents, caregivers, and whānau need to be supported to understand the importance of offline cultural connection, community and support, but that their young person may be seeking community and connection online as well.

Case study 15: Te Kura Māori o Ngā Tapuwae – upholding mana and community connection

Te Kura Māori o Ngā Tapuwae is a special character kura based in Māngere, Tāmaki Makaurau Auckland.[442] The kura, which has young people from years 1-13, has a strong focus on young people connecting with their language, culture, identity and wider community. The kura has high levels of trust with their ākonga and whānau, which means when difficult conversations arise, they lean on these relationships to find ways forward. They ensure that young people have a deep understanding of who they are, their responsibility to their community, and their whakapapa, which is a solid base from which to build media and information literacy and digital citizenship. The school acknowledges that young people need to have trust and relationships with their teachers to discuss what is occurring online and feel comfortable that they won't be judged or treated unfairly if they make mistakes or do something wrong.

A key part of these conversations is the principles and values shared by young people, teachers, and the wider school. The focus is on maintaining the mana of all involved and working alongside ākonga and their whānau to whakatika (make things right) and maintain strong connections and relationships. Individuals are part of a collective, including their whānau and their school. Young people need to see themselves and others as part of this collective and therefore deserving of respect and mana enhancing ways of being and interactions. The kura has robust and high functioning discussions across all age groups and with the wider school whānau about the negative impacts of media, including how they can navigate disparaging and racist statements that they see online and offline and endure on a daily basis. The kura uplifts ākonga and the wider school whānau, highlighting how these media representations are not reflective of them, and they are far better than these portrayals. These discussions also occur in the monthly hui with parents and whānau, ensuring that the whole community is uplifted, supported, and included.

7.3 Keeping the positives in frame and the risks in perspective

Parents and whānau need a balanced view of the online environment, particularly when they discuss social media with their young person. There are many positives of young people having access to the online environment, from being able to research and gain knowledge, to connecting with other young people online, and exercising independence from their families. The power of the internet and the potential for young people to harness it is great, and many young people feel that adults don't understand these positive aspects of the online world.[365] Much of the discussion about young people and their relationship to either social media or the online space more generally has been framed negatively, particularly in relation to the parents/whānau role which has been largely focused on protecting young people from danger.[49] Resources and support have been closely linked to mitigating or minimising these risks. By keeping the positive aspects of the online world in frame, there is less risk of parents ostracising young people and making them disengage from conversations about these topics. There has been a degree of scaremongering and this has led to some parents framing any discussions in a negative and risk averse way without seeing the balance of the positives of being online.[49] The online environment can itself be a place of community and offer a sense of belonging and place, and play a part in identity development. This is particularly true for minority, marginalised, or socially isolated groups who may be geographically dispersed or struggle to connect

with one another offline.[49] The online environment offers significant opportunities to access different perspectives and connect with a wide variety of people, and parents, caregivers, and whānau need to be aware of these positives in discussions with young people.

The online environment can itself be a place of community and offer a sense of belonging and place, and play a part in identity development.

The community can be an enabler

The community can be an enabler when looking to expand or implement media and information literacy. Getting parents and the wider community on board is particularly important when there is a new concept or programme being taught. Rotorua Primary School, as outlined in Case study 10, found that with concerted community engagement, community members who initially had questions and concerns about the school becoming more digitally focused, quickly became supporters.[76] This lesson from Rotorua Primary School and their transition to becoming a digitally focused school, highlights the importance of parents understanding the purpose and aims of media and information literacy and digital citizenship in order for a programme to be a success.

7.4 While schools are increasingly limiting some parts of the internet, but some homes are still catching up

Overseas publications indicate schools increasingly use protective software that limits the type of content and social media platforms accessed on the school Wi-Fi.[128] In these jurisdictions, school and kura approaches include monitoring what young people are accessing on devices, either through flagged content being reported or software that allows the teacher to see the young person's screens as they are working. From a New Zealand context, subsidised internet filtering options for schools was available in the early 2000s and since 2013, government has fully funded a 'Managed Network' internet service for schools, delivered through crown entity the Network for Learning (N4L). The service includes a suite of five security and safety controls, which schools can choose to opt-in to or out of. These controls include Domain Name System (DNS) Threat Protection, SafeSearch, and network content filtering for web traffic and inbound firewall connections.[449] All eligible state and state-integrated schools can use the service and under the current devolved model they can select which of the five elements are enabled and whether some settings should be adjusted up or down.[450] Several baseline filtering profiles exist for different categories of user and devices joining the network. When taken together these provide students with a baseline level of protection while learning online at school.

Key takeaways:

- Parents, caregivers, and whānau need resources that promote their media and information literacy and digital citizenship and provide ways to support their young person.
- A government body in charge of promoting media and information literacy to young people could also empower the general population.
- Media and information literacy and digital citizenship initiatives supporting adults need to be pedagogically relevant to meet the needs of the various communities and ages.
- Different communities, parents and whānau need to codesign media and information literacy and digital citizenship programmes that work for their community's needs.
- An important protective factor for young people and their online experience is a strong culture identity and sense of self offline. However, for some people they may find their strong sense of self and connection online, particularly LGBTQI+ and immigrant young people.
- Schools need to include parents and whānau on the media and information literacy and digital citizenship journey, sharing the ideas and tools being used in their classroom. Parents and whānau are a vital part of our young people having the media and information literacy and digital citizenship skills.
- A positive frame and balanced view are important when discussing media and information literacy with young people.
- Schools are increasingly monitoring online content; parents and whānau need to be aware so they can make informed choices and have discussions at home.

8. He Uru Kahikatea: people working together supported by a media and information literacy and digital citizenship system

The title of this report, He Uru Kahikatea: building young people's resilience through media and information literacy and digital citizenship skills, takes inspiration from the whakataukī 'He Uru Kahikatea' which speaks to the entangled root system of a stand of kahikatea trees. Just as a stand of kahikatea is extremely strong because each tree is supported by the intertwined roots of other kahikatea, young people, schools, their whānau, and community are stronger together in the face of polluted information. Our conclusions reinforce the importance of collective action, collaboration, and community approaches to addressing online harm and polluted information. What young people are facing online is increasingly complex, and they need to be equipped to face the challenges and harness the opportunities in digital environments.

This report emphasises the strength of a systematic approach to media and information literacy and digital citizenship. There is no silver bullet that will equip young people with the skills, attitudes, and dispositions to navigate the online environment and polluted information. We need to take a whole of system approach, which equips teachers, produces resources, embeds learning across the curricula and supports parents and the wider community to support young people through engagement in their own media and information literacy and digital citizenship learning. There is a significant opportunity for New Zealand to harness the international evidence base, learn from other countries, and create a media and information literacy and digital citizenship programme of learning that acknowledges the unique educational priorities of our context, while also being inclusive of all. The ultimate goal is to equip young people so they can confidently navigate the rapidly changing online environment with critical thinking skills and dispositions that will be useful throughout their life. We hope that this report provides both the wero and evidence base to accelerate this work.

There is a significant opportunity for New Zealand to harness the international evidence base, learn from other countries, and create a media and information literacy and digital citizenship programme of learning that acknowledges the unique educational priorities of our context, while also being inclusive of all.... We hope that this report provides both the wero and evidence base to accelerate this work.

Annex 1: social media and online technological landscape

Social media and online platforms that young people use have various technological factors influencing their social media and online experience. Table 20 outlines some of the key factors which are shaping social media and the online environment, and the potential benefits and risks of this technology.

Table 20: Social media and online technological landscape.

Technology	Summary	Benefits	Risks
1.1 Curation algorithms.	Social media companies use algorithms that curate what content a user sees. Algorithms are used to ensure that the content is relevant and of interest to the user,[52,451] and that they stay on the platform for a longer period of time. Curation algorithms have large influence on Facebook feeds,[451] TikTok's For You page,[52] and Instagram's explore and feed.[452,453] They are also used by search engines to help dictate the search results which appear.	• Individuals see content which is of interest and more relevant to them.[52,454] • People can find their community online, with evidence that minorities, the LGBTQI+ community and women can find content and safe spaces online.[455]	• Political content that elicits strong responses, including negative, is more likely to be rewarded by the algorithm.[454] Divisive content which captures attention is therefore more likely to be spread on platforms which can further entrench ideas.[456] • Can create individualised curated content online, meaning that people see content dependent on their ideas and interactions online, which can vary drastically between individuals, as acknowledged by some platforms,[52,455,456] fueling polarisation. There is some debate as to the extent this occurs[457] and some research questions the validity of the so called filter bubble hypothesis.[82]
1.2 Moderation.	Moderation refers to removing or managing content or people who breach user and community guides of a social media platform. Content which breaches user guidelines includes that which incites violence, contains nudity, hate speech, or polluted information. Moderation is split into two types, ex-post and algorithmic, with most social media companies using both.[85,458-460] Exact techniques of moderation are unknown, due	• Content can be removed which breaches community guidelines.[458,459] • Removes extremist and terrorist content.[466]	• Some groups feel they are being disproportionately moderated.[467] • Disagreement about what and who should be moderated.[468] • Currently, processes are largely dictated by social media companies, with few democratic states regulating this process.[458] • Extremists who are moderated can move to other platforms which aren't moderated, with

	to social media companies largely being closed-book. Some moderation techniques include: removing posts, removing accounts, link to official information, blurring graphic content, content warnings, and removing hashtags.[459,461-464] Advertisements on social media platforms can be moderated.[465]		some evidence they become more toxic on these platforms.[464] • Posts with warning tags have the potential unintentional consequence of being ignored, or make the user believe the content more, or increase the desirability of the videos for young people.[469] • Users can circumvent hashtag bans by adapting the hashtags and descriptions they use.[461]
	Ex-post moderation. Moderation which occurs after content has been posted, relies on people reporting the content; this essentially crowdsources moderation, with human review of the reported content. In some cases AI is also doing this.[460]	• Allows for human understanding of nuance or cultural references. • Involves wider online users in the process, ensuring that members of the community contribute to moderation.	• Time constraints on moderators mean they have only tens of seconds to moderate a post.[460] • The individual moderator has a level of subjectivity, which impacts on moderation practices.[460] • Relies on users reporting content.[462]
	Algorithmic and AI moderation. Moderation occurring through algorithms, largely occurring as content is posted, has a broad intent for algorithms to uphold community guidelines.[462] AI is also increasingly being used, especially on platforms with large scales.[468]	• Intercepts content before being posted, meaning that it doesn't reach other users.[470] • The technology will continue to develop and strengthen over time, ensuring greater accuracy into the future. • Allows for much larger scale than ex-post moderation.[462]	• Moderation is only as good as the algorithm and the guidelines it seeks to uphold.[462] • Algorithms are likely to make hundreds and possibly thousands of mistakes a day.[460] • Can have unintended impacts on content which doesn't breach community guidelines, e.g., changes in Tumblr's algorithm meant sex education material was removed, not just explicit images.[460,467] • Algorithms can miss or misinterpret slang or country specific language.[470] • Currently non-transparent and difficult to audit or regulate.[470]

			• Limited transparency can fuel lack of trust in the moderation process.[85]
1.3 Deepfakes.	Deepfakes refer to the ability through AI and technology to alter, superimpose, or change video, images and audio, usually changing those who appear in the content.[471] The AI technology is rapidly evolving, meaning convincing deepfakes can now be made easily and cheaply.[471]	• Innocent use of deepfakes for creative content.	• Risk of being used as polluted information to sow political divisions.[455] • Can increase the effectiveness of cyber enabled information warfare, being utilised by foreign actors to interfere in domestic democracy.[472] • Increasingly convincing, making it difficult for an average member of the public to identify media as a deepfake.[473] • Individuals', including celebrities', images are being transplanted onto pornographic materials, with some being circulated online. This constitutes a form of image based abuse and online harassment.[474]
1.4 Community and user guidelines.	Community and user guidelines are produced by social media companies, and set out expected behaviour on their platform. They are used in moderation, with breaches of the guidelines grounds for removal of content or a user.[459] Community and user guidelines are publicly available and generally are extensive[459,475-477] but how they are implemented is more opaque.	• Gives a set of rules that users are expected to abide by and a mandate to remove content which isn't in line with this.[477]	• Currently dictated by social media companies.[478] • Not uniform, each social media platform has slightly different guidelines.[478] • The extent and manner in which they are enforced has remained largely invisible.[470]
1.5 Paid advertising.	Social media companies employ paid advertising as the key revenue stream.[479] By collecting users data, they can ensure that paid advertisers can target groups who are most likely to engage with an advertiser or buy a product.[479-482]	• Advertisers, including social and community groups can reach communities.[480] • Can help with public health or emergency messaging.[483]	• Issues and concern of data privacy.[484] • Advertisers as the key source of revenue are the main customer for social media companies, not users. Social media companies are focused on maintaining and expanding paid advertisers with the users the secondary focus.[479]

		• Social media users have ads which are more relevant to them.[479,480,482]	• Can include polluted information (in spite of advertising moderation) particularly when there is complexity – including greenwashing or unverified medicinal claims.[485-487] • Has been used by foreign countries to influence domestic elections.[485] • Users may struggle to identify what is paid advertising and what isn't.[488]
1.6 ChatGPT and related LLM.	AI is increasingly being used both online generally and on social media platforms. ChatGPT is an AI Chatbot released by OpenAI in November 2022 which has made waves in both the academic community and general public.[313] ChatGPT creates realistic sounding text when responding to prompts, it creates the text using neural networks which digest huge amounts of existing human-generated text. Each output is unique, meaning it isn't picked up by plagiarism checkers.[489] The outputs of ChatGPT are imperfect and there are still substantive gaps between quality writing and ChatGPT outputs,[490] but this gap is likely to continue to close as the AI develops and expands.[489]	• LLMs can access information quickly drawing information together from multiple sources.[489] • Produces original content each time.[313] • Can be guided by the user to produce more specific or accurate outputs.[489]	• Concern about plagiarism and using LLMs for work, in the education system, and academic community.[489,490] • The very real near-term potential that AI/ChatGPT will be able to write as well or better than humans with the potential for AI to takeover areas of research.[313] • LLMs cannot currently adequately distinguish between false and accurate information.

Annex 2: what technology is currently available in New Zealand schools and what is needed?

In order for schools to effectively teach digital skills and media and information literacy, there needs to be sufficient and reliable digital infrastructure in place.[491] Currently, the technology used in each school varies, with a wide range of systems, devices, spending, and commitment.

Following a cyber attack on the Waikato District Health Board in 2021, MoE advised the Government that greater central support for core digital infrastructure and software was needed to protect schools from cyber attacks, privacy breaches, and operational failure. A range of tactical measures were implemented from mid-2021 and a case for longer-term investment in cyber security and digital support has been drafted for consideration by Cabinet. If approved, this will see a shift from schools being required to manage their own digital infrastructure and services to greater centralised support.

Digital devices are encouraged in schools, but how and to what extent they are used depends on individual schools.[492] Currently, MoE provides core digital infrastructure, including programmes and some security; however, the day to day running of schools' digital infrastructure is largely dependent on individual schools who either deal with this in-house or hire a company to do this.

MoE acknowledges that using digital devices in the classroom helps build digital fluency and increase young people's engagement, but there isn't funding allocated currently to ensure every child has a device to use.

There are different models for schools providing digital devices, these include:

- Shared devices: devices provided by the school, give young people access to technology, and have to be used in small groups or rotated around activities.
- 1:1 Devices provided by school: all young people access a device whenever they need to. Devices may be supplied by the school or BYOD or a mix of BYOD and provided.

The evidence base for these two techniques is mixed, with some studies showing a 1:1 device ratio increasing digital skills and fluency, while some studies show that 1:1 device learning could reduce overall student achievement. While there is debate, it is clear is that access to reliable devices that meet the young people's needs is important for their learning.[493]

There are two mechanisms to provide devices to young people, these either occur through school provision or PLD, each of these options comes with various challenges and benefits.

Devices provided by the school

- Require capital investment, which might be funded from various sources: savings, charitable grants, community fundraising, parent contributions or partnerships. The Ministry currently does not allocate funding directly for digital devices, with schools able to choose how much they allocate to this area.[492]
- Some schools may choose to purchase devices while others might lease them, this is up to individual schools.[492]
- The devices can range from Chromebooks to iPads to desktop computers.

BYOD devices

- Can have a wide variance in quality and what they can do.
- If schools want to manage what young people are accessing, they need to have permission to install programmes on these computers.
- If schools specify what device a young person should bring in, this can put significant financial pressure on families.
- Cost is placed on parents, caregivers, and whānau; to ensure equity amongst learners. There needs to be programmes and funding in place for young people who can't afford to purchase devices.

What next? How can we give young people the devices and tools they need?

Current infrastructure is ad-hoc. Schools need some level of consistency if they are first to strongly instill digital skills and fluency into their young people and secondly equip them with media and information literacy and digital citizenship to navigate the online environment. Provision by the government would help to bridge the digital divide and ensure every young person had access to a quality device. Beyond this, if MoE had more input into the digital infrastructure, programmes and systems that schools have in place, and were able to provide more support in these areas, there would be greater consistency across the education system. This could help to ensure that every school, teacher, and young person had the digital infrastructure needed to be digitally fluent and media literate. It is also important to consider how the home environment, including disparities in access to Wi-Fi, may impact young people and their families.

Annex 3: challenges that young people are facing online

Young people are facing a range of challenges online (see Table 21). Many of them are not new, or not exclusively due to social media, but have been amplified by its presence.

Table 21: The challenges young people are facing online.

Challenges	Description	Impact of social media/the online environment
2.1 Finding community.	Community and finding like-minded people is an important part of moving into adolescence and adulthood for young people.[49] Having a sense of belonging and people who understand your identity, interests, viewpoints, and ideas are important.[49] The rise of social media means it is now much easier to find people you relate to and community than it has ever been before, particularly for those outside the mainstream and those seeking to connect in like-minded activities in their local communities. For the LGBTQI+ community, social media can be used to build community, normalise identity, and create connections with peers.[446,494] Ethnic minorities' online communities can help disseminate information and support each other in periods of crisis[495] and enhance their sense of belonging.[496] One study showed how Chinese communities in South Korea used online community to discuss and better understand COVID-19.[497]	• Online community allows for people with radical and extremist viewpoints to find one another,[498,499] with some online communities calling for their radical views to be translated to action offline.[500] Often the views shared online cannot be shared, or would not be accepted, by the majority of people online.[499] • Some extremist groups which are able to be readily formed online include those who espouse Islamophobic views[500] and racist ideologies.[498,499] There is some evidence that as people are challenged and discredited offline, they lean more into their online identity and beliefs.[499]
2.2 Foreign interference.	Political interference from foreign states into domestic politics is a real challenge. Broadly, the intent is to sow division and subvert trust in democratic institutions and erode societal cohesion.[455,501] Even the knowledge that foreign interference is occurring can undermine trust in officials and democratic institutions.[502,503] Foreign interference leverages existing tensions within a country, often through real harmful information, or simply false information, or more often a disorientating mix of both.[92,504] Foreign interference	• Can easily reach people during election periods, seeking to influence the outcome and undermine democracy.[455,505,506] • Occurring on a much larger scale than before the internet.[92,505] • Can occur with a relatively small investment and small numbers of people involved.[92,501]

	occurred long before the internet and social media, but has been amplified by the digital age.[92,504]	• Can amplify the polluted information environment on social media to create further chaos, including through bots and deepfakes.[92,504] • Can utilise social media advertising to spread divisive messages and polluted information to key areas.[485]
2.3 Polluted information.	Polluted information occurred long before the internet, but has been amplified and made more complex by social media.[92] Polluted information which is hard to identify as false or misleading is the most effective,[92] occurring through foreign interference, corporate interests, civil society organisations, and the wider public.[504] Conspiracy theories come under the umbrella of polluted information.	• Not filtered through journalists or newsrooms.[92] • Quantity of polluted information has increased.[501] • Fringe conspiracy theories can be pushed more into the mainstream.[507] • Social media has democratised platforms, meaning that any individual can create and spread polluted information, with many falsely posing as experts.[508] • The polluted information environment has the potential to impact offline actions, especially in terms of health,[508] including COVID-19 vaccine hesitancy.[473,509] • Reliable information struggles to achieve cut through in the polluted information environment.[510]
2.4 Radicalisation and extremism.	Radicalisation and extremism may lead to issues of national security. Although the vast majority of people who are influenced by conspiracy theories will never go on to commit physical violence,[511,512] the potential for radicalisation and extremism online to translate into offline actions is of particular concern, since if it does occur the results may be catastrophic. Extremist views can be wide-ranging but tend to include a mixture of xenophobia, homophobia, transphobia, racism, misogyny, religious intolerance, antisemitism, and conspiracy theories.[513]	• Exposure to extremist views can lead to radicalisation.[512,514] • Social media platforms allow organisation of extremist groups.[507] • The online environment has been used to plan and broadcast terrorist attacks.[455] • Only in a few cases does extremist online activity lead to police taking action.[515] • Polluted information and conspiracy theories can help fuel radicalisation and extremism online.[513] • Online communities are places to espouse fear and othering of minority groups, often affording 'safe' places for people to share their extremist views.[500,515] • Groups on platforms allow for more extreme views to be espoused. If groups are moderated or reported on

		mainstream platforms they can move to more fringe platforms where their views aren't moderated in the same manner.[507]
2.5 Child safety.	Children's safety has always been of significant concern. Grooming and exploitation are key issues, and the internet has continued to amplify the importance of young people being aware and equipped to avoid these potential dangers. One study found that even professionals in this area need more skills to support young people effectively, particularly those who have suffered online abuse.[516] There is a limited but growing research into online grooming.[517]	• Groomers can pose as a young person, setting up a fake profile when talking with young people online or through social media.[518] • Abuse and exploitation can occur from any place in the world.[516] • Groomers may blackmail young people to intimidate and control them, preventing them from seeking help.[518] • The impacts on young people online are sometimes viewed as less serious than those offline, but research has shown the same enduring and devastating impacts on young people.[518]
2.6 Data sovereignty.	Data sovereignty broadly refers to the right to determine what happens to your data, including how and whether it is collected. Indigenous data sovereignty refers to indigenous control of indigenous data.[519] In New Zealand, Māori have experienced over-surveillance resulting in more data being collected about them.[519] Data may be asserted as an asset or resource which is implicitly extracted; this goes against indigenous understandings and is seen as part of the broader process of data colonisation.[520] Data sovereignty is about the collective, and ensuring that groups, not just individuals, have the right to privacy and protection of data.[520]	• A significant rise in the amount of data being collected, both on social media and online generally.[519] • Data being used for advertising. • Government can use social media sites to target specific groups with advertising and messaging. • Use of social media and the online environment for surveillance by the government.[520] • Data is increasingly seen as a commodity to be used or harnessed, rather than something with protection and rights attached to it.[520]
2.7 Privacy.	Privacy is the right to keep information to yourself, or to people close to you, and spend time out of the public sphere. The digital age has meant that the issue of privacy has been expanded due to the constantly accessible online environment and the high volume of data which is collected and available.[521]	• Young people having images shared online by their parents, caregivers, and whānau without their consent.[522] • The issues of privacy have become more intrusive, penetrating, and frequent.[521] • The amount of information available with which privacy can be breached has increased substantively.[521]

2.8 Sexting.	Sexting refers to sharing texts, photos or videos with sexual or erotic content.[523] It often occurs between people who are dating, interested in dating, or in a relationship.[523] It is common practice and for many young people is seen as an essential part of relationships.[524,525] Discussion around the risks and dangers of sexting is most productively focused on when it goes wrong, namely forwarding images and harassment, rather than labelling the whole practice as wrong.[525]	• Snapchat is often used for intimate pictures, due to images being able to disappear after set periods of time (although they often are screen-shotted).[526,527] • Sharing images without consent can readily occur, leading to image-based abuse.[524]
2.9 Image based abuse.	Image based abuse is the broad term for sharing intimate photos and videos without the consent of the individual or individual within them. Revenge porn is included in this term, although image based abuse is the preferred term among activists and academics.[523] Image based abuse is a form of dating and relationship violence and is gendered, with research showing higher incidences of men sharing content without consent.[523,524] There are some diverging views about the extent to which it is gendered.[528]	• Social media has allowed for the proliferation of image-based abuse to occur. With many incidences of former or current partners sharing photos without permission, and pervasive slut shaming narratives.[523] • A systematic review into sharing sexual images found that non-consensual sharing/forwarding of these images was potentially commonplace, with rates likely higher for adolescents.[528] • Has allowed for the sometimes viral spread of these intimate images, meaning abuse occurring at a large and un-ending scale.[523] • Women are often seen to be held responsible if images are shared, even when this occurs without their consent. Future research is needed into the gendered nature of sharing images.[528]
2.10 Cyberbullying.	Bullying is a pervasive issue young people face, particularly in a school environment. The impacts of bullying are wide ranging, but can lead to poorer mental health and lower grades in school, as well as other behavioral concerns.[49] Minority groups are disproportionately impacted, with LGBTQI+, Māori, ethnic, and Pacific communities all facing higher rates of bullying in New Zealand.[44,529,530] Research into bullying has traditionally focused heavily on the victims, identifying those things that connect them	• Literature shows that offline and online bullying are connected, meaning that young people who are bullied in person are also facing this online.[529] • Young people can't escape their bullies, even in their home environment, meaning that young people may be on edge around the clock.[49] • There is a growing body of evidence that time online doesn't alone dictate whether a young person experiences bullying.

	and why they might be susceptible to bullying, without adequately considering the wider culture which allows bullying to occur.[529]	Even those who spend short periods of time online can still be bullied.[529] • A cross-national analysis of young people's social media use and cyberbullying, found that problematic social media use is a higher risk factor for perpetuators and victims.[531] • There is a higher level of ambiguity online than in person, which can make it difficult to tell whether interactions are a joke or malicious, this ambiguity can cause stress for young people.[532] • The gap in understanding between young people and their parents, caregivers, and whānau's generation can make it difficult for them to support young people who experience cyberbullying.[49]
2.11 Body image.	Young people are navigating body image, with pressure to fit into the idealised body type. For men, this is generally seen as muscular with limited body fat and the female body is slim and fit but still with some curves; often implicit in this ideation is whiteness and being non-disabled.[533] Research has been conducted into the impact of social media on young women's body image, with growing work on the impact on young men.[534,535] Those at higher risk of body image dissatisfaction are those with high levels of social media use.[536] There are still gaps in the literature with further research needed, particularly on how social media impact Māori, Pacific, LGBTQI+, and marginalised communities' body image.[534] Research in New Zealand found that a strong connection with Māori culture has the potential to buffer against Western body ideals and lead to greater body satisfaction, including individuals with higher BMI.[537-540] There is research that shows equipping young people with social media literacy could have a mediating effect on body image, as well as reducing the amount of time spent on social media.[536,541]	• Social media platforms can allow the glorification of weight loss;[274] platforms have failed to adequately moderate content encouraging eating disorders.[542] • Many young women are comparing themselves with 'fit' and 'attractive' influencers and peers, which can promote negative body image and potentially impact their mental health.[534,535,543] • Young men's body image is also impacted by social media.[533] Research in the Netherlands showed that young male gym users' comparison of physical appearance with other social media users increases the likelihood of using dietary supplements, with 9.0% of those surveyed using androgenic anabolic steroids. The study found that image-centric social media use (Instagram, TikTok, etc.) was correlated with negative body image.[544]

2.12 Mental health.	Since 2009 there has been a decline in young people's mental health.[545] The New Zealand Health Survey shows an upward trend in psychological distress since the 2011 survey; there are groups who are disproportionally impacted, including women, Māori, Pacific people's, and those facing higher deprivation.[546,547] This has been parallel to a growth in awareness of mental health issues. A meta-analysis of research into mental health found that the majority of mental health disorders are diagnosed in adolescents or young adulthood, with evidence that mental health disorders that occur in this time often impact young people over their life course, highlighting the importance of support during this period.[545,548] COVID-19 added to a further decline in young people's mental health.[549] A systematic review of young people's mental health after the pandemic began saw increased depression, anxiety, psychological distress, and increased feelings of loneliness and isolation.[550] Beyond this, other factors, including climate change, are impacting our young people.[551]	• There is a correlation between the rise in social media use and the decline in young people's mental health.[552] Still, the evidence base for causation at a population level is significantly weaker and a point of substantive debate.[553] • There is stronger evidence that social media may impact a small portion of young adults negatively and potentially a small portion positively, but not across the board.[549,553] • Research has shown stronger evidence that excessive use, and use which interferes with sleep, could have the most potential to negatively impact young people.[554]
2.13 Pornography.	The vast majority of young people are accessing or have viewed pornography.[555] Pornography is being used by some young people as a mode of sex education,[556] but often gives an inherently distorted view of sex, not necessarily reflective of offline experiences. Pornography has traditionally been through a male gaze and broadly objectified women in this process.[556] For gender diverse and LGBTQI+ young people, pornography can lack representation, but offers an avenue of exploration of sexual identity and potentially could be the only source of education about their sexual identity.[555,556] While research shows that young men are accessing pornography at higher rates than young women, some of the literature questions the extent of this, pointing to the potential for young women to under-report, due to feeling and being judged	• Free and easy access.[556,557] • People can easily access material that depicts abuse.[556] • Young people potentially incorporate online pornography inspired practices, some of which are unwelcome, including violence, into offline sexual interaction.[555-557] • Young people can be shown pornography in school settings by peers, stumble across it online, or purposefully search for it.[556] • Concern that consent is not being displayed in much pornography, leading to offline behaviours that aren't respectful of consent.[556] • Pornography may embed gendered assumptions of the man being dominant and the woman being submissive.[556]

	differently for their sexuality.[556] More research into the impact of pornography on offline risky sexual behaviours is needed.[557]	• Can perpetuate body dissatisfaction in both young men and women.[556]

Annex 4: regionally allocated professional learning and development

Currently, the main programme directly funded through the MoE is regionally allocated PLD. The Regionally allocated programme operates through a contestable fund to which schools apply. The system generally only allows limited numbers of teachers on specific programmes and weighs up school needs with others in the region.[558] A regional allocation panel which can include iwi, principals, school leaders, and members of representative groups access the applications giving recommendations to the Regional Director of Education who ultimately approves allocations.[558] There is a limited amount of money allocated to each region.

For a PLD application to be successful, it must align with one of the seven PLD priorities. This process has seven steps for applying for PLD:[559]

Step 1	Identify your PLD needs: what are the needs of your school, kura and cluster?
Step 2	Look at the PLD priorities: the PLD needs to align with one or more of these.
Step 3	Create a PLD application: the PLD leads creates an application through an online system, this process includes a written application and resources to support this.
Step 4	The regional allocation panel reviews applications and make recommendations to the Regional Director of Education.
Step 5	PLD is approved or not approved: within 5 weeks the PLD leads will be able to see the outcome on the online system; applications may receive fewer or more hours than requested, or may not be approved.
Step 6	The PLD lead secures a PLD provider from an online MoE database of accredited facilitators to work with and then allocates hours to the facilitators through the online system. This needs to occur within six months, and the hours must be used within the approved time.
Step 7	Once the facilitator is confirmed, the PLD lead works with them to refine the focus and outcomes of PLD, agreeing to and issuing a Statement of Work.

Once PLD has been accepted, there is a four step process for planning and reporting:[559] Not every teacher has the opportunity to develop their digital fluency* through PLD.[560] This process for PLD means the PLD in the region and school that has occurred in the past is factored into the decision of where to allocate PLD.[559] This means that a school which receives PLD for digital fluency in the past is less likely to have their application for digital fluency approved. This would impact media and information literacy and digital citizenship if they were to be included in PLD priorities.

PLD has limited hours allocated within which teachers complete their training. There is some literature overseas that shows that those who choose to do digitally focused PLD tend to already

* The focus of digital fluency is supporting teachers and young people to use digital technologies to enhance learning. This includes being a producer of digital content and understanding the social impacts of digital technology. Digital fluency is about helping young people develop critical literacy skills in digital contexts. The focus on digital fluency has been more squarely on equipping teachers with digital skills themselves and the pedagogy of how to teach young people digital skills. While this gives a strong base on which to build media and information literacy, media and information literacy needs to be taught on top of more general digital skills.[524]

have an interest in the digital area, meaning there is a level of self-selection for regionally allocated PLD and through other PLD.[360] School wide PLD can be particularly important, especially when every teacher is expected to deliver a specific programme.[561] If schools are not able to access regionally allocated PLD to take a school wide approach to upskilling their teachers in a digital area, they have the option to fund the PLD themselves or not provide PLD for teachers in this area at all.

Annex 5: the Harmful Digital Communications Act 10 communication principles

The HDCA provides some guiderails to appropriate online behaviour. These are referred to as the Communication Principles.[125] Digital communication should not:

- Disclose sensitive personal facts about an individual.
- Be threatening, intimidating, or menacing.
- Be grossly offensive to a reasonable person in the position of the affected individual.
- Be indecent or obscene.
- Be used to harass an individual.
- Make a false allegation.
- Contain a matter that is published in breach of confidence.
- Incite or encourage anyone to send a message to an individual for the purpose of causing harm to the individual.
- Incite or encourage an individual to commit suicide.
- Denigrate an individual by reason of colour, race, ethnic or national origins, religion, gender, sexual orientation, or disability.

Annex 6: country comparison of critical thinking and digital literacy in the education system

Table 22: Country comparison of critical thinking and digital literacy in the education system.

Country	Media literacy rank[145]	PISA reading literacy 2018[147]	National strategy(ies)	Critical thinking in the curriculum	Digital skills in the curriculum
Finland.	1	520	Multiple national strategies see Section 2.1.	Critical thinking is embedded throughout the curriculum.	Digital skills are embedded throughout the curriculum.
Norway.	2	499	Action plan for digitalisation in primary education (2020-2021). The report acknowledges the rapidly changing online environment. Schools should be equipped with physical digital infrastructure and the resources and digital tools needed to deliver the curriculum. Outlines steps to better equip teachers and provide more support to schools. Highlights the importance of data protection and privacy.[562]	Critical thinking is a value of basic education, with the importance of scrutiny and critique of established ideas.[563] Democracy and participation is another value, which includes the ability to understand minority and majority opinions and create a space for disagreement and dialogue.[563]	Digital skills are acknowledged as one of the five basic skills that young people should gain through education, alongside oral skills, reading, writing, and numeracy. Acknowledges that digital skills are an essential part of educating young people.[564] Digital skills include the ability to use digital tools, media, and resources efficiently and responsibility, to find and process information. Digital skills include gaining digital judgement and understanding of how to use the internet responsibly.[564]
Denmark.	3	501	National Strategy for Digitalisation: together in the digital development, is an all of government strategy.[565] The strategy includes Vision 9: a population ready for a digital future. This vision outlines:	Critical thinking is a cross-curricular subject area. The purpose of the subject is to strengthen a student's ability to take a critical position and focus on freedom of expression.[566] Critical thinking is embedded in social science studies, but also in general teaching practice for every	IT and Technology is a cross curricular subject area, spanning across the curriculum.[568] The curriculum acknowledges the rapidly changing social media environment and that it has altered the way that teachers teach and young people learn.[568] Digital judgement, the ability to behave as digital citizens, is

			• All Danes should have digital skills to take advantage of the digital environment.[565] • Every Dane should be able to navigate social media critically and safely.[565] • Digital technology must be a core part of the education system, including relating to this technology critically and constructively.[565]	subject, ensuring that critical thinking is taught across the curriculum.[567]	acknowledged. The curriculum sets out four student positions: • The student as a critical examiner. • The student as an analysing recipient. • The student as a purposeful and creative producer. • The student as a responsible participant.
Estonia.	4	523	Estonia's education strategy for 2021-2035 has digital skills and inclusion embedded within it, identifying the importance of these to the future of education,[569] following on from the lifelong learning strategy 2020.[569] Some key areas raised in this strategy, include: • Developing digital pedagogy, ensuring teachers are developing and using digital skills for educational innovation.[569,570] • Learners are aware of the risks and benefits of an information society[569,570] • Digital skills, inclusion, and literacy are essential for learners to have to meet the needs of society and the labour market.[569,570]	• Developing critical thinking is acknowledged as a goal for basic schools in the curriculum.[571] • Appropriate critical thinking skills are expected as a competence at each stage of study.[571] • Critical thinking is mentioned across cross-curricular topics.[571]	Digital skills are acknowledged as a key part of the curriculum. In 2014, the national curriculum required every student to develop digital literacy; not just practical skills, but also system and algorithmic thinking.[572] • Cross-curriculum competency entitled 'Digital competence in basic and secondary schools', with appropriate skills sought at different age groups and across subjects.[571] • 'Information environment' is a cross-curricular topic in basic and general secondary schools, focussed on ensuring young people become information-conscious and are able to critically analyse information.[571] • 'Technology and innovation' is a cross-curricular topic.[571]

Sweden.	5	506	The Swedish National Digitalisation Strategy for the School System 2017-2022 includes the following key objectives: • Children have adequate digital skills to achieve digital competence, with a focus on infrastructure as well as technical and pedagogical support.[573] • Staff who work with children and young people are competent in digital tools.[573] • Principals and school leaders can lead digital development in their schools.[573] • Digital tools must be accessible to staff and young people.[573]	The curriculum was revised in 2018: • Schools are responsible for ensuring that young people can make use of critical thinking by the time they leave compulsory school.[574] • Critical thinking and critical examination is mentioned across subjects in the curriculum, from civics education, to Swedish, to chemistry and biology.[574]	• The curriculum acknowledges the importance of digitalisation throughout.[574] • Digital skills are identified as a key competence.[574] • The curriculum sets out both the opportunities and risks of the digital environment that need to be navigated.[574]

Annex 7: the school and kura-age curriculum in New Zealand

This section provides more detail to supplement Section 4 of the report.

What is the purpose of the national curriculum?

The National Curriculum for primary and secondary schools comprises the NZC and Te Marautanga o Aotearoa. The NZC is for English medium schools, while Te Marautanga o Aotearoa is for Māori-based kura. The curriculum is high-level and not prescriptive, meaning that schools and teachers have the mandate and scope to dictate how they teach and fulfill the curriculum. The National Curriculum gives high level direction, but does not specify pedagogical practices. At the time of writing, pedagogical approaches and practices for literacy, communication, and mathematics are planned to be specified through the Common Practice Model, part of the Literacy & Communication and Maths Strategy.[149]

The National Curriculum periodically gets refreshed, with the last occurring in 2007.[183] The technology learning area was also revised in 2017, largely due to the significant changes in the technology learning area, which includes digital technologies, between 2007 and 2017.[343,575] The curriculum is undergoing a refresh currently with implementation occurring from 2021-2027 (see Annex 10).[37]

Local curriculum – allowing schools to make decisions

The local curriculum is a feature of the New Zealand education system; it places decision-making and implementation practices at the school level, bringing the NZC to life for young people.[11] The local curriculum reflects that each school and their young people have different needs. Schools must base their local curriculum on the NZC, but there is a large amount of flexibility to shape their curriculum for their young people's needs. The principles of the NZC should underpin the local curriculum, with the values, key competencies, and learning areas providing its base.[11] MoE outlines how informal assessment is an important part of understanding young people's progression and how the local curriculum is working for young people.[576]

The local curriculum is about the wider community, including parents, whānau, Iwi, and local industry, having input. It draws on these groups' expertise and resources and must include them in the school's strategic planning.[343] Young people's voice should also be included in the local curriculum.[343] What a local curriculum looks like in practice is ultimately up to individual schools, and there is a large variance in what each school's local curriculum looks like and how it functions.[11] School leaders and boards should self review the local curriculum and evaluate its effectiveness;[577] outside of the school, there is no process for local curriculum evaluation.

Key competencies

Within the curriculum there are five key competencies. Key competencies refer to capabilities that young people need to have and to develop for learning and living.[327] The key competencies aren't taught as specific subjects but should be embedded across learning areas and promoted through a local school curriculum.[327] The key competencies are similar to many other competencies found in curricula around the world, although the specific names and focus varies between countries.[335] The key competencies are the same in the 2007 curriculum and the refreshed curriculum.[339]

The five key competencies in New Zealand are:[327]

- Thinking.
- Relating to others.
- Using language, symbols, and texts.
- Managing self.
- Participating and contributing.

There is an acknowledgement by a report commissioned by MoE from the NZCER that the key competencies are currently not being utilised to their full extent, with the potential for teachers to embed them further into their classroom practices.[335] Further research by NZCER highlighted that for young people to benefit from and grasp the key competencies there would need to be greater opportunities to discuss, practice, and experience these.[578]

Revising the technology learning area: why this area being constantly updated is so important
The technology area covers both material and digital technology. The revision saw a pivot to a greater emphasis on digital technologies and an acknowledgement of the vital role they will play in young people's lives. The fast-moving nature of digital technology means the technology learning area must be general enough so as not to need to be updated every few months but specific enough to be relevant to the digital context young people are facing. The 2017 update includes two new technological areas:

- Computational thinking for digital technologies.
- Designing and developing digital outcomes.

In Hangarau Wānanga Ako of Te Marautanga o Aotearoa there are two new tupuranga (strands):

- Te Whakaaro Rorohiko (Computational thinking): includes using te reo Māori to express problems, formulate solutions and solve them using algorithms, programme, and data representation.[579]
- Tangata me te Rorohiko (People and computers): includes designing and developing digital outcomes while considering rangatahi's role and responsibility as digital citizens.[579]

The Ministry sought to provide support to schools and teachers to understand and implement the updated curriculum, including online professional development and some opportunities for face to face formalised professional development. The Kia Takatū ā-Matihiko | Digital Readiness Programme was designed to support teachers and schools to implement the new curricula content; this was a combination of face to face and online resourcing. This ceased in 2020, with the expectation that teachers would be at this stage implementing the curriculum in their work.[382,575] However, there is ongoing availability through the regionally allocated PLD, which currently includes digital fluency as one of its priorities.

The 2017 change in focus aimed to ensure that young people have the opportunity to design and create digital solutions, not just use and consume them.[575] The technology curriculum has three strands: technological practice, technological knowledge, and the nature of technology. The nature of technology section includes critique of technology and understanding of its impacts on societies and environments. It is intended that young people be able to critically assess the impact of new technologies on cultural, ethical, environmental, and economic conditions, providing a good foundation for digital citizenship and media and information literacy.[311]

Annex 8: how does initial teacher education work in New Zealand?

The Teaching Council sets ITE requirements for each ITE provider and is the regulatory and professional body for registered teachers. ITE consists of professional experience placements and practicums, which vary in length depending on the provider. There is a minimum of 80 days in the classroom for a one year programme and a minimum of 120 days for a three year or longer programme.[373] The time in the classroom gives practical experience in managing young people and delivering lessons, with support from an associate teacher. The rest of the ITE programme is outside the classroom and includes lectures, tutorials, readings, and assignments. There is debate within the sector about the optimal balance between theoretical and practical experience and whether teachers leave ITE with the correct skills to be first year teachers.[580]

Schools then have a responsibility to support them through the two year induction and mentoring programme which is completed as part of their provisional practicing certificate.[373] The Teaching Council outlines the importance of teachers' inquiry-based learning, the ability to continue to reflect on, develop, and adapt their pedagogical practice, using evidence-based methods to underpin what they do in the centre or classroom.[373] Effectively equipping student teachers with pedagogical skills for media and information literacy and digital citizenship must be balanced alongside competing priorities in ITE.

As of 2021, there are 41 programmes for primary teachers and 21 programmes for secondary teachers.[373] Secondary teachers must complete an initial undergraduate degree and then move on to a graduate diploma, postgraduate diploma, or Master's degree, with 84.3% receiving a graduate diploma.[373] Primary teachers can either do a graduate diploma, postgraduate diploma, or Masters after they complete an undergraduate degree or enter a three year Bachelor programme, with 65.8% studying a degree, 29.8% a graduate diploma, and 4.4% through a Masters.[373] The number of people going through a training programme has been declining, with 1,885 fewer people training in 2020 compared to 2005. However, there was an increase in people seen in the 2021 intake.[373]

Annex 9: avenues for professional learning and development in New Zealand

Table 23: Avenues for PLD.

Type of PLD	What is it?	Would it work for media and information literacy/digital citizenship?
Regionally allocated.[559]	• Funded through the MoE. • Limited contestable funds for which schools have to apply and make a case. • Limited to four topics for English medium and four for Māori medium. • May be directed to a limited number of teachers. • Factors in what PLD schools have received (so if a teacher has already gone through a digital focused PLD last year, they are unlikely to be able to go through another digital focused PLD the following year). • Schools choose PLD providers from a MoE database of accredited facilitators.	• Media and information literacy could be included as a PLD priority. • Would be constrained by current funding, and potentially take away funding from other PLD areas if included without additional funding. • Currently doesn't take a whole of school approach.
CoLs.[581]	• A group of education providers that form around young people's learning pathways. • Schools within communities of learning are resourced to allow time for teachers to work together to address achievement challenges. • Each community of learning has specific goals or achievement challenges on which they work together. Inquiry time is provided to each provider; every school is provided with at least 0.05 FTE. • Participation in a CoL is voluntary, and schools can join, withdraw, or switch.	• Media and information literacy and digital citizenship could be included as a goal or achievement challenge. • There could be resources disseminated through CoLs. • There are limited amounts of FTE time and media and information literacy and digital citizenship would add to an already packed CoL remit. • Would only be relevant for those schools and providers that are part of CoLs.

Networks of expertise.[582]	• Subject associations and other peer to peer networks. • Each network operates differently and provides different forms of support and development for teachers. • Includes Digital Technologies Teachers Aotearoa (DTTA) and Robotics and Computer Science in Education.[583] • Subject area focused. • Some have funding for the NCEA change programme, or the implementation of the NZ histories curriculum. • Supported by Teacher Development Aotearoa.	• Focused on subject/area specific. • Allows for teachers to share knowledge. • Limited capacity to deliver nationwide PLD. • Doesn't allow for external PLD. Media and information literacy and digital citizenship expertise is currently limited within the education sector – there would need to be capacity building to deliver this.
School funded.	• Schools spend their school budget on PLD with sign off from their board. • Doesn't have to fit within the criteria for the regionally allocated PLD, giving more flexibility to what is covered. • Can operate on a school wide level for every teacher and can include support staff. • Significant cost for schools. • May include large providers such as Google, Apple etc. • Large variance in what PLD providers deliver.	• School funded PLD is focused on what individual schools need with a high level of autonomy. • With the school and board, forcing schools to spend some of their funds on media and information literacy and digital citizenship focused PLD would remove this autonomy.
Kia Takatū ā Matihiko | National Digital Readiness Programme.[583]	• Launched by MoE. • Online resource for teachers to access. • Focused on the 2017 curriculum changes in the technology learning area. • Included webinars, resources, and access to an online community. • Ran from 2017-2020.	• This programme has ended; however, a similar programme which includes online resources and an online hub could be formed for media and information literacy and digital citizenship. • Funding would be required. • Is online the best method of delivery for PLD?

Technology online (Learning area specific MoE website).[299]	• An online resource for teachers to access which outlines technology as a learning area in the curriculum. • A self guided website. • Provides some exemplars or lesson plans for technology lessons. • Includes online webinars. • Links to external resources.	• Online delivery and self guided, teachers would access this at different stages/levels. • No current capability for teachers to share their knowledge or understanding with each other.
Kahu Pūtoi.[381]	• For Māori medium and kura. • An online support space to share ideas, skills, knowledge, and support fellow teachers, e.g., Te Kete Ipurangi and Kauwhata Reo.	• This platform could include more resources around media and information literacy and digital citizenship.

Annex 10: the curriculum refresh

As discussed in Section 4, the curriculum is undergoing a refresh, with different parts of the curriculum being refreshed and rolled out between 2021-2027.[584]

A progression model

The framework for the curriculum is changing to a progression-focused curriculum with five phases of learning (years 1-3, years 4-6, years 7-8, years 9-10, years 11-13) that replaces an outcomes focused curriculum with year levels.[584] This shift allows for a curriculum that provides a big picture view that looks forward, describing signposts or 'waypoints' which act as signals of a learner's continued growth, development, and sophistication through each phase.[585] Each phase of learning should build on the last with increasing complexity and depth of knowledge. The curriculum moves to a framework of Understand, Know and Do.[310] These are described below:

- Understand: the big ideas that young people will grasp at each stage.
- Know: rich contexts for exploring the big ideas.
- Do: practices which bring rigour to learning.

A move to a progression focused curriculum ensures that competencies and values are described and woven together within the curriculum, whereas an outcomes focused curriculum saw competencies and values described separately. While teachers were expected to weave these throughout the curriculum, how they achieved this was not specified. The movement to a progression focused curriculum could allow for provision for thinking, including critical thinking, to be woven through the curriculum.[586] Progression acknowledges that young people may take different amounts of time to grasp a concept and that this is not always in a linear manner.

Timeline for the refresh

The refresh is rolling out in stages with each of the eight learning areas occurring at different times. Social science is first, followed by English, and Mathematics and statistics.[339]

Table 24: Refresh timeline.

Learning area	Timeline
Te ao tangata | Social sciences	Ready
English	In development, ready 2023
Mathematics and statistics	In development, ready 2023
Science	In development, ready 2024
Technology	In development, ready 2024
The arts	In development, ready 2024
Health and physical education	In development, ready 2025
Learning languages	In development, ready 2025

Te ao tangata | Social sciences, including Aotearoa New Zealand's histories

Social sciences is often seen as a natural home for digital citizenship, and media and information literacy, in large part due to critical thinking being a core part of the social science curriculum. Te ao tangata | Social sciences, including Aotearoa New Zealand's histories, has been the first part of the curriculum that has been refreshed.[338] This is the first part of the curriculum which has moved to the Understand, Know, and Do framework.[338] While critical thinking is included in the curriculum, this is

not in an online context; there is the potential for explicit mention of the digital and online context, and including media and information literacy and digital citizenship concepts in all subjects across the curriculum (see Section 4.6).

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