Developing an Indicator Framework for Digital Wellbeing: Perspectives from Digital Citizenship

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Executive Summary

Good living conditions are fundamental to human wellbeing. Even if there are no commonly agreed definitions of wellbeing, the report lays great emphasis on holistic understanding of health in relation to social and economic circumstances in evaluating quality of life. However, assessing digital wellbeing remains to be a daunting task considering that multiple factors come into play, especially in today's rapid digitalisation of infrastructure and introduction of innovations in the tech industry. Discussions on digital wellbeing began almost a decade ago by primarily critiquing the adverse effect of technology use. Much of the initial discussions sought to address concerns about the dangers of increased use of technology. Simultaneously, many acknowledged how digital tools can also enhance and uplift various aspects of life. These varied conversations provide a more nuanced understanding of wellbeing in the digital life. To address the need to establish a holistic understanding of digital wellbeing, the proposed framework in this report aims to identify indicators to assess the quality of life in the digital world.

Digital wellbeing is understood as an umbrella term that encompasses various dimensions of the digital life. Using a systematic review of existing materials on the topic, digital wellbeing is defined as:

- Crafting and maintaining a healthy relationship with technology that can be used in a balanced and civic way.
- Identifying and understanding the positive and negative impacts of engaging with digital activities.
- Being aware of ways to manage and control factors that contribute to digital wellbeing.

This report highlights nine key dimensions of digital wellbeing: digital safety and security, digital rights and responsibilities, digital health and self-care, digital creativity, digital emotional intelligence, digital communication, digital consumerism, digital employment and entrepreneurship, and digital activism/civic engagement. These dimensions of digital life explain the nuances of wellness in a digitally mediated environment. Based on the literature review, digital wellbeing is also closely interrelated with the notion of digital citizenship. Thus, three additional dimensions are introduced in the framework to reflect this relationship: digital skills, identity, and empowerment and agency. To provide a comprehensive overview of digital wellbeing across these dimensions, 24 competencies are introduced in the framework to help measure digital wellbeing.

Introduction

During the COVID-19 pandemic, discussions about digital wellbeing arose as its effects have affected every level of society (Google, 2020; Low et al., 2020; Merry et al., 2020; Tan & Tan, 2021). Particularly, scholars, policymakers, and health experts have been interested in evaluating a person's wellbeing through balanced and healthy use of technology (Burr & Floridi, 2020; CrashCourse, 2019; Google, n.d.; Organisation for Economic Co-operation and Development, 2019b, 2019a, 2019d; Siegerink, 2016). Recently, these aspects are evident in modifications found in gadgets. For instance, Google has shifted some of its strategies to introduce digital wellbeing as a core component in its software designs in 2018 while promoting digital safety and digital citizenship (Google, n.d.; Google et al., 2019; Hoechsmann & DeWaard, 2015). These features include measuring screen-time use, managing notifications, and setting bedtime modes (Google, 2021c). Around the same time, Apple has constantly redesigned phones, wearable technology, and software that tightly integrate and gauge a person's wellbeing (Apple, 2018, 2019, 2021; Gonzalez, 2018; Marsden, 2018; Perez, 2018). In a short span, conversations about digital wellbeing have entered the public sphere and continued to be implemented in many aspects of everyday life.

Emerging scholarly discourses on digital wellbeing have circulated in human-computer interaction and user experience design studies that examine the improvement of technologies to health outcomes (Burr & Floridi, 2020; Dennis, 2020), the social and physical wellbeing of vulnerable groups (Balakrishnan, 2017; Hill et al., 2015; Medina & Todd, 2019; Monge Roffarello & De Russis, 2019; Smith, 2020; Svoen et al., 2021; Thakur & Kang, 2018), and harm from gadget addiction (Hechanova & Ortega-Go, 2014; Monge Roffarello & De Russis, 2019; P. Espenida & Villaflores, 2019). Central to these topics is an underlying theme of empowerment and participation. However, these themes tend to overlap as they are often connected to other concepts relating to a person's overall wellbeing and literacy. Put simply, most existing frameworks focus on digital literacy and competence, which would lead to digital empowerment and citizenship. For instance, assessment frameworks have often overshadowed digital wellbeing under the larger discourse on digital citizenship – a proposition that is often the case for many key policies and assessment frameworks (British Columbia Ministry of Education, 2013; Dawkins, 2020; "Digital Literacy Fundamentals," 2012; Hoechsmann & DeWaard, 2015; MediaSmarts, 2015; Shin et al., 2019). In a review conducted by DQIndex.ORG platform, six thematic areas have been monitored

to lessen the digital skills gap. These include Digital Citizenship and Child Online Safety, Citizens' Digital Resilience and Cyber-Security, Digital Skills Education for Life-Long Learning, Digital Wellbeing, Workforce Digital Skills, Digital Gender Equality. Of these six themes, digital wellbeing remains understudied. This report addresses this gap.

Arguably one of the only assessment frameworks that primarily focuses on digital wellbeing is the Organisation of Economic Co-operation Development framework on people's wellbeing (Hoechsmann & DeWaard, 2015; Organisation for Economic Co-operation and Development, 2019a, 2019b, 2019c, 2019d). It evaluates wellbeing using offline and online indicators (e.g., housing, employment, education, work-life balance, social connections, subjective wellbeing) which draw from its Quality of Life framework. This framework, however, does not consider digital wellbeing as a concept and practice, or the specificity of technology. This has come to the fore especially during the rapid digitization brought about by the pandemic as digital technologies have been used to safeguard the wellbeing of populations (Google, 2020; Government Technology Agency of Singapore, 2020). Thus, there is a need to create a specific assessment framework that also considers the multi-faceted aspects of the digital society. Thus, this report aims to benchmark its digital wellbeing metrics against already-established indicators and frameworks. It also introduces three new indicators missing in current discussions: digital consumerism, digital employment and entrepreneurship, and digital activism and civic participation. These indicators have shown to improve a person's digital wellbeing as they not only contribute to self-fulfilment and enjoyment, but more importantly, foster self-empowerment and agency – ideas that proponents of digital citizenship have promoted.

Therefore, this report begins by reviewing scholarly studies and publications that discuss various aspects of wellbeing in everyday digital life. It discusses how these frameworks were located, sorted, and categorised according to their intended purposes. Extant assessment frameworks on digital wellbeing will be examined to establish a working definition of digital wellbeing. This entails mapping the taxonomy of applications across diverse disciplines and contexts to identify the proposed pillars of digital wellbeing. This means formulating a proposed framework for the evaluation and assessment of digital wellbeing, which will be empirically tested in a future, larger project.

Methodology

For this report, the research team located and reviewed existing assessment frameworks, academic scholarship, and grey literature to identify key indicators that could be used to develop a digital wellbeing index. The search for existing research reports, policy documents, educational curricula, and assessment frameworks has been done via online search engines like Google as well as websites of major supranational institutions (e.g., UNICEF). For the review of scholarly publications, journal articles were sourced from the NUS Libraries, Google Scholar, and academic repositories and archives like Taylor and Francis, Sage Publishing, JSTOR, EBSCO, and ProQuest.

To collect the materials, the researchers used a combination of the following keywords: "digital," "wellbeing" or "well-being," "wellness," "cyber," "citizenship," framework/s," "literacy," "emotion/s," "health," among other related terms. For example, most inputted keywords in search engines included "digital wellbeing," "cyber wellness," "digital literacy," and "digital citizenship." The team also searched policy and assessment frameworks, speeches and lectures, and academic papers published by international and non-governmental organizations, governments, big tech companies, and academic scholars in the last 20 years. This was to ensure that the proposed framework would align with other existing frameworks and research publications on digital wellbeing. This search resulted in a data-set of 31 policy and educational frameworks as well as more than 35 academic publications.

After examining the selected publications, the team collated and synthesized definitions and concepts from the gathered materials. This process includes the identification of indicators, domains, and subdomains (in this order) from the existing frameworks. Definitions and theories from academic sources were also considered to provide a deeper understanding of the concepts surrounding digital wellbeing. Due to its supranational, adaptable, and inclusive nature, the team has decided to make DQ Institute's *Global Standard on Digital Literacy, Digital Skills, and Digital Readiness Framework* as the base framework in formulating the proposed digital wellbeing index. Given these considerations, key indicators are then correlated with digital citizenship as the primary backbone of the framework with digital wellbeing as its overarching theme.

A proposed framework on digital wellbeing is created by arranging indicators relating to digital wellbeing on top (verticals) such as digital safety and security, digital rights and responsibilities, digital health and self-care, digital creativity, digital emotional intelligence, digital

communication, digital consumerism, digital employment and entrepreneurship, and digital activism/civic engagement. It is positioned vertically on the framework to adequately provide a comprehensive view and understanding of wellbeing in several settings such as security, health, and communications. In other words, the framework intends to holistically assess a person's actual wellbeing. By placing this vertically, it signals that the framework puts digital wellbeing at the core of the framework. As the backbone, digital citizenship is placed on the side (horizontal) with indicators such as digital skills, digital identity, and digital empowerment and agency. It is placed horizontally since most discussions on digital wellbeing still anchor much of its premise on participation and empowerment. This means that one's wellbeing can be guaranteed once the basics (i.e., skills, literacy) are fulfilled while ensuring a person's self-determination and empowerment. Thus, digital citizenship still plays an important aspect in digital wellbeing.

Of these indicators, digital activism/civic engagement, consumerism, and digital employment and entrepreneurship are relatively novel to the framework (i.e., in relation to the DQ's framework). The team introduces these as most policy papers and assessment models do not mention or consider these indicators as crucial aspects in a person's wellbeing. Thus, all these indicators become the basis of the proposed digital wellbeing index (see Table 1). The team has considered these indicators to ensure a more universal and inclusive digital wellbeing assessment framework. This would hopefully address gaps and themes relating to digital wellbeing as a field of emerging study and practice.

Assessment frameworks

There are several frameworks that assess various elements of our digital life. Among the frameworks proposed in the past decade, most of these focused on digital access, literacy, and skills. As it is informed by emerging discussions about how digital technologies influence people's lives, these are pioneering efforts to understand the issues of digital identity and digital citizenship. At the same time, these assessment tools have been designed according to the contextual requirements that seek attention to targeted age groups, national populations, international communities, and particular professions. These frameworks are categorised according to their targeted audience and purpose – international or supranational (tier 1) and national (tier 2) frameworks (please see Appendix A for the comprehensive list). Discussions of these frameworks

are framed under three themes: (1) frameworks that engage digital wellbeing; (2) frameworks that categorise digital wellbeing only as a subdomain; and (3) frameworks that only imply digital wellbeing through its discussion on digital literacy and citizenship. The following section offers an overview of major frameworks that have been reviewed to inform the new proposed assessment framework for digital wellbeing.

Tier 1 Frameworks

Council of Europe's Digital citizenship handbook (CoE)

The Council of Europe recognises "values, attitudes, skills and knowledge and critical understanding" as key areas of competences for democratic culture. Its digital citizenship handbook offers a set of ten digital domains across three key themes: Being online, Well-being online and Rights online. Being online refers to the "information related to how we engage and exist online," Well-being online indicates the "information related to how we feel online," and Rights online means the "information related to being accountable online" (Richardson & Milovidov, 2019, p. 11). The base for digital citizenship is structured by competencies for democratic culture work and includes five constructs: policies, stakeholders, strategies, infrastructure and resources, and evaluation work. In addition, a digital citizen's engagement in the community is dependent on nine contextual, informational, and organisational guiding principles that ensure the societal and educational progression towards digital citizenship. This framework engages multiple stakeholders and is shaped by a set of contextual, informational, and organisational principles (Richardson & Milovidov, 2019).

Digital Kids Asia-Pacific (DKAP)

As a framework that concentrates children's holistic development, it provides avenues for kids to be empowered in a digital society by bolstering their cognitive, behavioural, and socio-emotional competencies (Shin et al., 2019). This framework addresses economic and social differences as they contribute to digital wellbeing. Like DigComp 2.0's definition, wellbeing is categorised under safety and resilience which promotes and protects health and wellbeing, which is defined as (1) identifying and managing health risks; and (2) using digital technologies to secure and uplift physical and physiological wellbeing (Shin et al., 2019; Vuorikari et al., 2016). As in

other frameworks, wellbeing is discussed under digital literacy and citizenship, which is DKAP's primary goal. Thus, this framework provides suggestions to effectively address concerns over children's digital empowerment such as rethinking digital citizenship beyond literacy and safety, including children as key stakeholders, building support systems, reimagining the possibility of screen-time as a positive experience, coordinating efforts to minimize the digital divide, empowering girls to improve self-confidence, and developing intersectoral partnerships to solve issues on digital citizenship (Shin et al., 2019). This framework also highlights one important consideration when evaluating and realizing these competencies – the digital divide. Its research shows how different countries (i.e., South Korea, Vietnam, Bangladesh, Fiji) experience and implement digitization differently (Shin et al., 2019). Those in more affluent and digitally resilient countries become more competitive and knowledgeable in digital skills (see also UNESCO, 2019). This point is crucial in contextualizing and situating the geopolitical divide of wellbeing.

DQ Institute Global Standards Report 2019

DQ Institute's *DQ Global Standards Report 2019: Common framework for digital literacy, skills and readiness* offers global standards related to digital literacy, digital skills, and digital readiness. Developed with the help of 25 existing frameworks on digital literacy and skills, Digital Intelligence (DQ) is defined as a "comprehensive set of technical, cognitive, meta-cognitive, and socio-emotional competencies that are grounded in universal moral values and that enable individuals to face the challenges and harness the opportunities of digital life" (Park, 2019, p. 8). In other words, DQ stands as an umbrella term to organise various digital competencies that help equip individuals to improve their quality of life by maximising the benefits of technologies and minimising its harms. This framework includes eight areas of digital life to cover different aspects of one's individual life that allow the adoption of different requirements of the digital life. These areas include digital identity, digital use, digital safety, digital security, digital emotional intelligence, digital communication, digital literacy, and digital rights. The competencies derived from these areas are further grouped in three levels of maturity, such as digital citizenship, digital creativity, and digital competitiveness. These levels allow a suitable learning option according to the life stages of the individual. Through a combination of eight areas of digital life and three levels of maturity, this framework identified 24 competencies. These competencies are then broken down into three components of knowledge, skills, and attitudes and values to match the OECD Education

2030 Learning Framework. According to the OECD Education 2030 Learning Framework, the development of a "competency" involves "the mobilization of knowledge, skills, attitudes and values to meet complex demands" (Park, 2019, p. 18). These 24 competencies are linked to and aligned with existing assessment frameworks. Despite defining these competencies to understand various challenges of digital life, the DQ framework limits its specific discussion of 'wellbeing' to the context of 'digital use. The framework understands 'wellbeing' only as an outcome of balanced, healthy, and civic use of technology.

European Digital Competence Framework (DigComp 2.0)

The DigComp 2.0 framework serves as a guide for macro-level institutions, especially for the European Union, which gives its relevance and importance. Primarily, it is designed as a tool "to improve citizens' digital competence, to help policy-makers to formulate policies that support digital competence building, and to plan education and training initiatives to improve digital competence of specific target groups" (Vuorikari et al., 2016, p. 5). Thus, it introduces dimensions of competencies allowing people to participate in an ICT-centred society by enumerating competence areas. In realizing its goals, this framework considers a multisectoral approach among the education, employment and business, and government sectors to streamline their efforts (International Telecommunication Union (ITU), 2020; Vuorikari et al., 2016). Its five competence areas include (1) information and data literacy; (2) communication and collaboration; (3) digital content creation; (4) safety; and (5) problem solving (Vuorikari et al., 2016). This framework only mentions health and wellbeing only as a subset of safety. It defines health and wellbeing through three characteristics: (1) avoiding and mitigating physical and physiological harms; (2) protecting from dangers in digital environments; and (3) incorporating social wellbeing and inclusion in digital technologies (Vuorikari et al., 2016). This definition draws on the World Health Organization's meaning of wellbeing as an all-encompassing term that considers the person's holistic state of wellness (Vuorikari et al., 2016). The definition is broad as the model is intended as a guide for other EU national governments to implement. This framework highlights wellbeing in relation to a people's quality of life, especially when the entire region is undergoing rapid digitization. However, digital wellbeing is not a salient point of this framework.

International Network for Government Science Advice Report on Digital Wellbeing (INGSA)

INGSA's report examines the impacts of digitalisation on the wellbeing of individuals and societies. INGSA prepared its report for OECD as part of its 'Going Digital' programme of work and presents a framework that focuses on three aspects of wellbeing that are affected by digital transformation: the evolving institutions of self, of social life, and of civic life. Its study begins with an understanding that the OECD's wellbeing measurement framework is insufficiently sensitive or multi-dimensional to account for the rapidly changing context of digital transformation. The INGSA initiative develops a better analytical instrument to assess the impact of transformative digital technologies. It understands 'institutions' as the formal laws and governance mechanisms as well as the informal, less codified rules and norms in society. It argues this broader definition of the institution helps understand "the digital revolution on individual and social wellbeing because it can accommodate the most human-focused of our institutions: the institutions of the self; institutions social life; and institutions of civic life" (Gluckman & Allen, 2018, p. 10). It also stresses that the application of this instrument at these three levels of institutions will help reveal the complex implications of digitally driven change in behavioural patterns that underpin wellbeing. This framework demonstrates the importance of using a collective lens to assess the role of digital technologies in wellbeing. Additionally, it also highlights the importance of understanding nuances in emerging technological advancements as well as demarcating the difference between governance and government in relation to the individual and social life. It also suggests a holistic approach to human wellbeing. Thus, it introduces five dimensions of wellbeing including human development and early childhood learning; mental health across the lifespan; personal and public security; social inclusion and trust; and governance and quality decision-making (Gluckman & Allen, 2018).

International Telecommunication Union's Data citizenship framework (ITU)

ITU's new data literacy framework, called "Data Citizenship," focuses on three domains such as Data Thinking (citizens' critical understanding of data), Data Doing (people's everyday engagements with data) and Data Participation (people's proactive engagement with data and their networks of literacy). Based on the systematic review of existing academic and grey literature, this framework understands data literacy skills as one's capacity to manage and critically think about

data. It has categorised these skills into two domains: Data Doing and Data Thinking. In addition, this framework revealed a third area of digital practice concerned with the proactive participation of citizens in a data society. Suggesting a new concept of "networks of literacies," the third area of Data Citizenship has been termed "Data Participation" (Pawluczuk, et al., 2020, p. 61) as it focuses on persons who actively participate in online forums and privacy debates, make use of open data for the betterment of the community, promote the use of a secure password, and ensure the security of personal information. This framework contributes to the discussion of the digital wellbeing by highlighting the relevance of skills for practical management and critical thinking about data while engaging with their families, friends, and communities in a 'datafied' society. This framework was supported by the UK citizen data literacy survey carried out by 'Me and My Big Data' in 2019. Its findings revealed many are uncomfortable with the practice of sharing their personal information online (Data Thinking). Similarly, users expressed concerns over the credibility of the online information (Data Doing). Finally, the survey suggested that those who claimed to be 'data thinkers' and 'data doers' are more likely to be active data participants. These results break the assumptions of the natural adoption of digital literacy by the young generation (Pawluczuk, et al., 2020). This framework suggests the significant role of education and socioeconomic status in defining one's interaction in a data society.

Organisation of Economic Co-operation and Development (OECD)

Published by OECD in 2019, the framework assesses the quality of life in the digital age by measuring its advantages (access to information, increase in human productivity) while attempting to mitigate its disadvantages (data breach, surveillance, cyberbullying, job loss). It is primarily intended to help policymakers make interventions that cope with digitization as well as indicate a people's wellbeing in the digital age. The framework introduces 11 key dimensions to a person's wellbeing and discusses the role of ICT access and use to understand its effects in society (Organisation for Economic Co-operation and Development, 2019a, 2019d). These dimensions are divided into two categories: quality of life and materials conditions. Under quality of life, dimensions include the following: (1) health status; (2) work-life balance; (3) education and skills; (4) social connections; (5) civic engagement and governance; (6) environment quality; (7) personal security; (8) subjective well-being (Siegerink, 2016). Under material conditions, dimensions include: (1) income and wealth; (2) jobs and earnings; (3) housing (Organisation for Economic

Co-operation and Development, 2019a; Siegerink, 2016). These dimensions measure an individual's wellbeing from population averages and differences across groups. These would preserve different types of capital such as (1) natural capital; (2) economic capital; (3) human capital; and (4) social capital (Organisation for Economic Co-operation and Development, 2019a; Siegerink, 2016). For this capital accumulation to be realized, the OECD suggests that policymakers and governments should address digital divides to enable inclusivity that reduce socio-economic inequalities; empower the people through digital upskilling; maximize benefits from digitization efforts and strengthen policies that ensure digital security; and create more evidence-based research that evaluate wellbeing in the digital society (Organisation for Economic Co-operation and Development, 2019c).

Tier 2 Frameworks

Singapore Cyber Wellness Framework

Singapore's Cyber Wellness Framework serves as its Ministry of Education's backbone for its digitisation efforts in the education sector. As part of the Character and Citizenship Education initiative, cyber wellness focuses on the "well-being of our students as they navigate cyberspace" (*Practising Cyber Wellness*, 2021) as it aims to teach students relevant knowledge, skills, and tools to provide them a safer cyberspace. It also teaches them to use technology more responsibly, positively, and meaningfully and make them more empowered digital citizens (*Practising Cyber Wellness*, 2021). The government intends to integrate it into Singapore's educational system to improve students' competencies and achieve these principles of cyber wellness: "respect for self and other," "safe and responsible use," and "positive peer influence" (*Practising Cyber Wellness*, 2021, online). It complements this aim with five topics: (1) cyber use talks about sustaining an equilibrium between online and offline activities; (2) cyber identity discusses creating a healthy and appropriate online identity and expression; (3) cyber relationships tackle cyberbullying, netiquette, and fostering meaningful and respectful online relationships; (4) cyber citizenship focuses on understanding the digital sphere, handing behaviour and content online, and enabling a positive presence in online communities; and (5) cyberethics deals with making and sharing online content responsibly while respecting copyright laws (*Practising Cyber Wellness*, 2021). This framework highlights how teaching cyber wellness could go beyond the

classroom and, with parents' help and guidance, transform students into better digital citizens in the future. While discussions on cyber wellness are brief, they are important as they underpin the policy framework that Singapore's Ministry of Education is using. Anchoring its definitions within understandings of digital literacy and digital citizenship, this framework focuses on wellbeing through cyberbullying, addiction, and parental control. This focus suggests that by being empowered and knowledgeable, students could become responsible digital citizens. As a result, they would understand the proper behaviour to foster a healthier and safer online environment. This would, in turn, contribute to their overall cyber wellness since they will enter a digital space where threats and risks are reduced while maximising its benefits and potentials.

Singapore Digital Readiness Blueprint

Aimed at providing Singapore a route map to digital readiness and becoming a smart nation, this blueprint offers recommendations to improve digital access, digital literacy, and technology adoption to achieve equitable digital inclusion. Guided by four strategic thrusts, it is to ensure that the Singaporean people are better equipped with skills and knowledge for the safe and confident use of digital technology. It considers the private sectors and community organisations as key partners in helping its citizens embrace and adopt digital technologies. It calls for the collaboration of different approaches under one holistic framework.

Digital readiness is defined as "a) having access to digital technology, b) having the literacy and know-how to use this technology, and c) being able to participate in and create with this technology" (MCI, 2018, p. 10). This framework offers three major aspects of digital readiness: digital access, digital literacy, and digital participation. Digital access highlights one's "ready access to affordable, inclusive, and trustworthy infrastructure." Digital literacy is defined as "the motivation and skills to use digital technologies with confidence." Digital participation encompasses the use of "technology to achieve a better quality of life and being a positive online influence" (10). Digital readiness also protects against negative technological impact and builds connected communities with the help of new opportunities afforded by technology (MCI, 2018).

Discussion

This section explores the reviewed assessment frameworks, policy documents, curricula, and academic literature to combine various approaches towards understanding digital wellbeing. Studies have already discussed the role and impact of digital technologies on our individual and social lives, looking at several aspects of digital life. These studies explicate how technologies have influenced the four critical social domains such as health and healthcare, education and employment, governance and social development, and media and entertainment (Burr et al., 2020). In addition to the definitions and tools contributed by these frameworks, this report's discussion also depends on the emerging academic discussions of digital wellbeing to understand the limitations of these assessments.

The first discussion theme focuses on assessment models that define and measure people's digital wellbeing. The OECD framework features prominently, perceiving wellbeing as a combination of both digital (e.g., knowledge, skills) and physical factors (e.g., infrastructure) that lead to the betterment of both the person and society (Organisation for Economic Co-operation and Development, 2019a, 2019c), and serving as a steppingstone towards higher goals such as improving human capital, unity, and prosperity (Burr & Floridi, 2020; Svoen et al., 2021). Responding to the OECD well-being measurement framework, INGSA highlights the significance of acknowledging distinct types of digital technologies to develop a utilitarian framework that can measure wellbeing in the digital age. For INGSA, wellbeing in this digital age is a broad concept and includes "elements of self-perception together with socially constructed expectations and objective material conditions" (Richardson & Milovidov, 2019, p. 9). Overall, these assessment frameworks and policies still anchor their definition on WHO's definition of wellbeing (World Health Organization, n.d.), which remains to be conventional – that is, considering most aspects except the digital.

New initiatives from the big tech companies offer to enhance the understanding of digital wellbeing. Google's definition of digital wellbeing is achieved through an intricate and sophisticated interaction of hardware and software that would enable a person to (literally) measure their health status and establish a balanced use of technology through user interface and design. In some regard, it sounds ironic as these companies produce income and revenue through continued and constant use of their products. This is caused by the profiteering algorithm that makes users interact with their gadgets even more, which might infringe a person's autonomy and identity (Burr

& Floridi, 2020; Gui et al., 2017; Monge Roffarello & De Russis, 2019; Smith, 2020). However, the constant use of technology should not be demonized. Rather, what must be considered is the quality of time one spends as well as the design of more human-centred software that genuinely improves their wellbeing (Dennis, 2020; Marin & Roeser, 2020; Regan et al., 2019). At the same time, there is an increase in academic research on digital wellbeing that tries to offer new directions for assessing digital wellbeing. For instance, studies have examined the impact of digital technology on individual and community wellbeing, such as: in discussions on security in relation to software and hardware technology use (Monge Roffarello & De Russis, 2019; Regan et al., 2019; Makin, 2018; Madden et al., 2012), age (Granic et al., 2020; Medina & Todd, 2019; Nansen et al., 2012; Leo, 2010; Sum et al., 2008), and gender (Sramova & Pavelka, 2019; Thakur & Kang, 2018). Recently, some publications have approached the concept from different perspectives. Studies have argued for the analyses of multi-device ecosystems to understand the impact of various technology use on well-being, stressing that every device can be a potential source of distraction. There can be also positive impacts when devices are used to perform a single, coherent high-level task (Roffarello and Russis, 2021). Similarly, scholars have called on the discipline to move beyond the negative aspects of technology use and acknowledge the role of person-specific as well as the device- and context-specific factors in assessing digital wellbeing. Examining digital wellbeing from this perspective, Vanden Abeele (2020) proposes a working definition that refers to digital wellbeing as a person's positive experience through balanced use of technology. In turn, this would beneficially contribute to one's cognitive and affective state. The author suggests that "people achieve digital wellbeing when experiencing maximal controlled pleasure and functional support, together with minimal loss of control and functional impairment" (p. 13).

Despite well-intended aims, most assessment frameworks on digital wellbeing such as OECD and INGSA still have a limitation: these are usually based on economically wealthy and highly influential countries and regions (Burr & Floridi, 2020). In this regard, developing countries may have difficulties coping with benchmarking against the assessment requirements. These measurements may also not be completely able to account for the nuances present in gathering and interpreting data. This has been a salient point featured in DKAP's report where there is little data on the Asia-Pacific region (Shin et al., 2019). This is important since other literatures suggest the important role socioeconomic status plays in one's wellbeing and overall participation in the digital sphere (Medina & Todd, 2019; Shin et al., 2019; Thakur & Kang, 2018). Thus, what these

frameworks may tend to neglect are the specificities that surround digital wellbeing, especially in terms of how individuals protect themselves when using digital technologies.

This gap leads to the second set of frameworks, which relate digital wellbeing to digital safety and security. Often interconnected, these frameworks' domains and indicators are used to understand or define the individual and societal wellbeing while engaging online. In both DigComp 2.0 and DKAP, this usually means ensuring a person's psychological and physiological state while providing a digital environment by minimising threats as well as incorporating social wellbeing and inclusion in digital technologies (Shin et al., 2019; Vuorikari et al., 2016). This is also similar to JISC's and CoE's definition, where digital wellbeing means acquiring skills and attitudes that foster wellness, enabling a conducive and safe digital environment, and being able to articulate one's identity (JISC, n.d.; Richardson and Milovidov, 2019; Shah, 2019). Unfortunately, the rhetoric employed in describing technology use may be limiting as it is often associated with screentime and addiction. It is important to note that these assessment frameworks do not emphasize on digital wellbeing itself. Rather, digital wellbeing is referred to in a small section under a larger domain, which is usually on literacy and empowerment. In fact, most assessment frameworks focus only on these two topics.

Perhaps the most common theme discussed across the frameworks primarily deals with digital literacy and citizenship, which is exemplified in most assessment frameworks and education curricula. Discussions revolve around the person's level of digital literacy and, how after going through upskilling, they could be empowered to participate and enjoy the benefits of digital life. Defined using various terminologies, some of these frameworks understand digital literacy as information related to how people engage and exist online; ability to use and evaluate information, data, and content online; ethical and social practices embedded in everyday online life; skills essential for conscious and informed digital participation in the data society; the motivation and skills to use digital technologies with confidence; capacities required for living, learning and working in a digital society; and skills required to consume, contribute and participate on the web (Chung and O'Byrne, n.d.; JISC, n.d.; MCI, 2018; Park, 2019; Pawluczuk et al, 2020; Richardson and Milovidov, 2019).

Another much-focused aspect in these frameworks is 'digital citizenship,' which is often considered an umbrella term that encompasses several competencies that help form a digital citizen. For instance, DQ's framework defines digital citizenship as the "ability to use digital

technology and media in safe, responsible, and ethical ways" (Park, 2019, p. 15). In the CoE's framework, digital citizenship is a set of competencies that contribute to the wellbeing of young people growing up in our digitised world. The handbook offers ten digital domains to define digital citizenship and its possession of capabilities "to actively, positively and responsibly engage in both on and offline communities, whether local, national or global" (Richardson, 2019, p. 11). To understand citizenship in a 'datafied' society, ITU proposes a 'Data Citizenship' framework that understands citizens as "proactive participants and co-creators of data society" (Pawluczuk et al., 2020, p. 61). These document data-related futures and initiatives (e.g., Mozilla Foundation), and focus on affluent Western regions and countries but it has not engaged Asia or the global South in their discussion (Baack & Maxwell, 2020).

  It is important to note that these frameworks do not directly articulate or discuss digital wellbeing. Rather, it is often implied and assumed that being literate and empowered would ultimately uplift a population's wellbeing. Educational curricula, taught through various forms of pedagogy, play a crucial role since these provide forms of intervention where people from all walks of life could be instructed on how technologies could be maximized for one's welfare (Common Sense Education, 2017, 2018; International Society for Technology in Education, n.d., 2021; SG Digital, 2020; Ministry of Education, n.d.). However, these curricula, assessment frameworks and policy documents on digital literacy and citizenship also have their shortcomings. For instance, they are usually skills/knowledge/performance-based indexes that are used to evaluate a person's skills for employment and career growth (DQ Institute, 2021; SG Digital, 2020; Smart Nation and Digital Government Office, 2018). In addition, these frameworks and discourses have convoluted and blurred the differences between skills and empowerment to wellbeing. Since they heavily rely on skills as a basis for assessment, they also tend to have some level of hierarchy. For example, most assessment frameworks tend to see skills like software development and video editing as higher forms competencies compared to simple computer tasks. In this manner, there would be a stratum to achieve and fulfil digital wellbeing (Burr & Floridi, 2020).

  Overall, these assessment frameworks, educational curricula, reports, and policies provide a comprehensive overview of digital wellbeing. Based on the gathered materials, three primary themes stood out. First, most frameworks are formulated with digital wellbeing as its metric. It usually measures aspects from both digital and physical aspects to encapsulate a person's holistic health and wellness. Second, some frameworks only consider digital wellbeing as a subset of a

domain, which is typically under digital safety or security. It means that one's personal and social wellbeing should be protected and enabled within digital environments. Third, other frameworks that focus on several aspects of digital life implicitly mention digital wellbeing. This is made possible since skills are needed to participate in this digital society. In turn, this would allow the person to create one's identity and proactively participate in socio-civic activities, which would ultimately contribute to one's wellbeing.

In a larger scope, these frameworks neglect to see three other indicators that contribute to digital wellbeing: (1) consumerism, (2) employment and entrepreneurship, and (3) activism and civic engagement. These have become important because sectors relating to these indicators have been undergoing rapid digitization, especially during the COVID-19 pandemic. For instance, the practices of activism and civic engagement have been transformed through social media and the internet which have allowed people to proactively participate in the ongoing political and social affairs in their respective communities. As such, these practices evoke a sense of empowerment that would, eventually, uplift a person's wellbeing as it creates a space for one's autonomy and self-determination (Smith, 2020). In this sense, this would also allow them to take part in cause-oriented groups and initiatives, thereby affecting changes not only in society but in the digital sphere as well (Melki & Mallat, 2014; Parigi & Gong, 2014). Observed in cases such as political consumerism (Kelm & Dohle, 2018; Kucuk, 2016), and #MeToo and LGBT online movements (Mendes et al., 2019; Ohlheiser, 2021; Sambaraju, 2020; Vivienne, 2016), this sense of empowerment and agency ensures a person's wellbeing in the digital world.

Thus, digital wellbeing is not just about skills, empowerment, subjective and social wellness, and physiological state. This report considers digital wellbeing as an umbrella term that encompasses various indicators discussed above as it includes a multifaceted approach in characterising the term. Given these considerations, the report defines **digital wellbeing** as:

- Crafting and maintaining a healthy relationship with technology that can be used in a balanced and civic way;
- Identifying and understanding the positive and negative impacts of engaging with digital activities;
- Being aware of ways to manage and control factors that contribute to digital wellbeing.

By understanding the issues surrounding assessment frameworks, this report's proposed framework addresses these concerns and provides a more inclusive and enabling approach towards assessing digital wellbeing.

Proposed Digital Wellbeing Framework

In the recent past, digital wellbeing has become a key concept in digital media research, informing different individual and social aspects of ubiquitous connectivity. Existing assessment frameworks and limited theoretical vocabulary struggle to explain digital wellbeing or the impact of various use of technology and the internet on the quality of life. In this context, this proposed framework and academic discussions outline a set of measures to understand wellbeing in digital environments. Informed by various assessment frameworks designed to analyse and understand the digital society, this framework considers nine dimensions that contribute to digital wellbeing. It is also necessary to understand the link between digital wellbeing and digital citizenship, which has three aspects. The definitions of each indicator are derived from the various frameworks and publications that this report benchmarks from. As shown, this is the proposed framework for digital wellbeing:

Table 1: Proposed Framework on Digital Wellbeing

		Digital Wellbeing								
		Digital Safety & Security	Digital Rights & Responsibilities	Digital Communication	Digital Emotional Intelligence	Digital Creativity	Digital Health & Self-care	Digital Consumerism	Digital Employment & Entrepreneurship	Digital Activism/Civic Participation
Digital Citizenship	Digital Skills	Safe and Secure Use	Rights and Responsibilities Online	Communicative Literacy	Emotional Literacy	Creative Literacy and Expression	e-Health Literacy	Consumer Awareness and Literacy	Productive Skills	Digital Political Literacy
	Digital Identity	Secure Identity Management	Responsible Netizen Identity	Participation and Identity Formation	Empathy	Content Creation and Evaluation	Self-care and Reputation	Autonomy and Data Management	Career Identity	Digital Political Identity
	Digital Empowerment & Agency	Safe Online Participation	Digital Footprint Management	Collaboration and Communication	Solitary and Relationship Management	Digital Creativity and Innovation	Healthcare and Social Wellbeing	Consumer Rights and Competencies	Innovation and Entrepreneurship	Digital Political Activism

The nine dimensions of digital wellbeing, which are placed horizontally, include:

1. **Digital safety and security**: The ability to critically identify, understand, and manage different levels and kinds of digital threats while being able one's identity, data, and wellbeing online within a safe digital environment.

2. **Digital rights and responsibilities**: The ability to be accountable online, to uphold human and legal rights using technology, and critically dealing with personal information.

3. **Digital communication**: The ability to establish clear and effective modes of communication that would allow expression and collaboration through technologies to achieve intended goals.

4. **Digital emotional intelligence**: The ability to critically recognise, evaluate, and express one's emotions as well as demonstrate empathy towards other people in digital interactions and environment.

5. **Digital creativity**: The ability to create and reimagine knowledge and technologies into reality through ICT tools and innovations.

6. **Digital health and self-care**: The ability to be aware of one's physical and psychological wellbeing and maintain a healthy relationship when using technology.

7. **Digital consumerism**: The ability to fair, informed, and equitable choice in the online market while being protected with consumer rights.

8. **Digital employment and entrepreneurship**: The ability to identify and use opportunities to acquire competencies to improve professional life and contribute to the global economy.

9. **Digital activism/civic participation**: The ability to spur and participate in cause-oriented groups and initiatives that affect meaningful changes in digital and physical environments; the ability to be protected against dis/misinformation while being informed with relevant and validated data.

Digital Citizenship is defined as the ability to articulate proactively and responsibly in the digital environment while using technology fairly and ethically. Vertically placed in the framework, the three key components of digital citizenship include:

1. **Digital skills**: The ability to confidently, critically, and consciously identify, understand, and use digital tools and technologies in everyday settings.

2. **Digital identity**: The ability to establish a holistic and differentiated online and offline identity.

3. **Digital empowerment and agency**: The ability to pursue and decide on personal goals and decisions; the ability to proactively engage with society and sustain meaningful online interactions through digital tools and technologies.

The interrelations between the horizontal and vertical aspects of digital wellbeing and digital citizenship respectively help us identify a total of 27 competencies.

1. **Safe and secure use**: Ability to use digital tools efficiently to manage cyber-risks and cyber threats, protecting digital content and digital infrastructures.

2. **Rights and responsibilities online**: Ability to observe and practice various rights and responsibilities of digital life.

3. **Communicative literacy**: Communicate online effectively and efficiently through various forms of multimedia.

4. **Emotional literacy**: Use and comprehend digital emotional jargons and cues (e.g., emoticons, like, share, etc.); identify emotional situations and contexts online.

5. **Creative literacy and expression**: Use, recognise, and understand digital and creative tools and social media platforms.

6. **e-health literacy**: Ability to access information and understand the consequences of digital consumption to ensure better physical and mental health.

7. **Consumer awareness and literacy**: Use and browse advertisements, goods, information, and services online; learn and understand novel digital commercial practices.

8. **Productivity skills**: Ability to learn and develop economic competencies to accomplish goals in professional life.

9. **Digital political literacy**: Ability to politically recognize, use, and evaluate digital platforms, tools, and content.

10. **Secure identity management**: Build and maintain a digital identity through safe, responsible, and ethical behaviour online.

11. **Responsible netizen identity**: Build a digital persona that upholds human rights online.

12. **Participation and Identity formation**: Responsibly articulate and express and manage thoughts and identities; positively impacting and establishing self-image and organization's reputation online.

13. **Empathy**: Become emotionally and ethically aware and sensitive of oneself and others; emotionally supportive and available for other people's needs and concerns.

14. **Content creation and evaluation**: Create and develop digital content by executing plans to creative outputs; engage and decide on problems through creative solutions; express identity through creative means.

15. **Self-care and reputation**: Use digital technologies offline and online effectively and autonomously to set examples for balanced use of technology.

16. **Autonomy and data management**: Transact and manage identity and preference data in digital markets; assess and achieve subjective wellbeing.

17. **Career identity**: Develop an identity through exploring and contributing to the digital economy.

18. **Digital political identity**: Develop a sense of political identity through exploring and contributing to social movements online.

19. **Safe online participation**: Work towards a safe and secure a common digital environment by developing protocols and promoting best practices.

20. **Digital footprint management**: Ability to take rightful and responsible decision to manage digital footprints to shape evolving digital culture.

21. **Collaboration and communication**: Collaborate with people of different cultural backgrounds and from distant places; engage with public figures and institutions; taking part in online social movements that positively impact communities.

22. **Solitary and relationship management**: Develop genuine relationships as well as bridge differences online that create a sense of alterity and belongingness.

23. **Digital creativity and innovation**: Reimagine and rethinking existing digital tools and content; produce creative solutions and ideas that positively impact communities as well as spur meaningful experience through digital means.

24. **Healthcare and social wellbeing**: Assert organizational and community practices that promote and ensure healthy use of digital tools and online platforms for improving individual and social wellbeing.

25. **Consumer rights and competencies**: Assert consumer rights and responsibilities in the digital marketplace; introduce innovative business practices that foster collaboration and maintain genuine customer-seller relations.

26. **Innovation and entrepreneurship**: Being part of a digital ecosystem to innovate and transform the global economy to build new opportunities for sustainable employment and entrepreneurship.

27. **Digital political activism**: Engage in politically motivated activities through online consumption, participation, fundraising, and hacking.

References

AlphaBeta (commissioned by Amazon Web Services). (2021). *Unlocking APAC's Digital Potential: Changing Digital Skill Needs and Policy Approaches.* https://pages.awscloud.com/APAC-public-DL-APAC-Digital-Skills-Research-2021-learn.html

Ang, R. P and Goh, D. H. (2010). Cyberbullying among adolescents: the role of affective and cognitive empathy, and gender. Child Psychiatry Hum Dev., 41(4), 387-97. https://doi.org/10.1007/s10578-010-0176-3

Apple. (2018, June 6). *WWDC 2018 Keynote — Apple*. https://www.youtube.com/watch?v=UThGcWBIMpU&ab_channel=Apple

Apple. (2019, June 5). *WWDC 2019 Keynote — Apple*. https://www.youtube.com/watch?v=psL_5RIBqnY&ab_channel=AppleAppleVerified

Apple. (2021). *WWDC 2021 — June 7 | Apple*. YouTube. https://www.youtube.com/watch?v=0TD96VTf0Xs&t=184s&ab_channel=Apple

Balakrishnan, V. (2017). *2nd Raffles Dialogue on Human Well-Being and Security* (pp. 1–8). https://www.smartnation.gov.sg/whats-new/speeches/transcript-of-speech-by-minister-vivian-balakrishnan-at-the-2nd-raffles-dialogue-on-human-well-being-and-security-on-4-september-2017

British Columbia Ministry of Education. (2013). *BC's Digital Literacy Framework*. 1–11.

Burr, C., & Floridi, L. (2020). The Ethics of Digital Well-Being: A Multidisciplinary Perspective. In C. Burr & L. Floridi (Eds.), *Ethics of Digital Well-Being: A Multidisciplinary Approach* (1st 2020., pp. 1–30). Springer International Publishing.

Chung, A., Gill, I. B., &, O'Byrne, I. *Web Literacy 2.0* [White paper]. Mozilla. https://mozilla.github.io/content/web-lit-whitepaper/

Common Sense Education. (2017). *What Is Digital Citizenship?* https://www.youtube.com/watch?v=mbbuLFUSd0A&ab_channel=CommonSenseEducation

Common Sense Education. (2018). Digital Citizenship Curriculum. In *Common Sense Education*. https://www.commonsense.org/education/digital-citizenship/curriculum

CrashCourse. (2019). *Digital Wellbeing: Understanding your tech usage - Tech Talk (IWD2019)*. https://www.youtube.com/watch?v=XFn7iN_hrQo&list=PLOU2XLYxmsILKB7ob2wsml3HI6a4e1Qwd&index=5&ab_channel=WomenTechmakersWomenTechmakersVerified

Dawkins, A. (2020). Chapter 4. Digital Citizenship, Digital Legacy, and School Librarians. *Library Technology Reports*, *56*(5), 17–21. https://journals.ala.org/index.php/ltr/article/view/7386

Dennis, M. (2020). Cultivating Digital Well-Being and the Rise of Self-Care Apps. In C. Burr & L. Floridi (Eds.), *Ethics of Digital Well-Being: A Multidisciplinary Approach* (1st ed., pp. 119–137). Springer International Publishing.

Digital Literacy Fundamentals. (2012). In *MediaSmarts*. https://mediasmarts.ca/digital-media-literacy/general-information/digital-media-literacy-fundamentals/digital-literacy-fundamentals

DQ Institute. (n.d.). *Global Standards*. https://www.dqinstitute.org/global-standards/

Ei, C. H & Soon C. (2021). *Towards a Unified Framework for Digital Literacy in Singapore* (IPS Working Papers No. 39). Institute of Policy Studies, Singapore. https://lkyspp.nus.edu.sg/ips/news/details/ips-working-paper-no-39-towards-a-unified-framework-for-digital-literacy-in-singapore

Gluckman, P. & Allen, K. (2018). *Understanding wellbeing in the context of rapid digital and associated transformations: Implications for research, policy and measurement*. The International Network for Government Science Advice. https://www.ingsa.org/wp-content/uploads/2018/10/INGSA-Digital-Wellbeing-Sept18.pdf

Gonzalez, R. (2018). Why Apple Can't Tackle Digital Wellness in a Vacuum. *Wired*. https://www.wired.com/story/apple-screen-time/

Google Developers. (2018). *Keynote (Google I/O '18)*. https://www.youtube.com/watch?v=ogfYd705cRs&ab_channel=KeepProductiveKeepProductive

Google, The Net Safety Collaborative, & Internet Keep Safe Coalition. (2019). *Smart Alert Strong Kind Brave: Digital Safety and Citizenship Curriculum* (p. 98). Google.

Google. (2018a). *Become aware of your personal tech use*. https://www.youtube.com/watch?v=8vKb81qvLhE&ab_channel=DigitalGarage

Google. (2018b). *What is Digital Wellbeing?* https://www.youtube.com/watch?v=zfpZpyYYzww&t=78s&ab_channel=DigitalGarage

Google. (2019a). *Digital Wellbeing: Find balance as a family*. https://www.youtube.com/watch?v=IixYf_9ZL_g&t=2s&ab_channel=Google

Google. (2019b). *Digital Wellbeing: Focus your time with tech*. https://www.youtube.com/watch?v=t5QBfHN6G-4&t=4s&ab_channel=Google

Google. (2019c). *Digital Wellbeing: Minimize distractions*. https://www.youtube.com/watch?v=BnrBwAg-Z4E&ab_channel=Google

Google. (2019d). *Digital Wellbeing: Unplug more often*. https://www.youtube.com/watch?v=svRzFYIu75U&t=2s&ab_channel=Google

Google. (2020). *Digital Wellbeing During COVID-19*. Google.

Google. (2021a). Balance your technology usage | Digital Wellbeing. In *Google Digital Wellbeing*. https://wellbeing.google/get-started/focus-your-time-with-tech/

Google. (2021b). Digital Wellbeing through technology. In *Google Digital Wellbeing*. https://wellbeing.google/

Google. (2021c). Digital Wellbeing tools. In *Google Digital Wellbeing*. https://wellbeing.google/tools/

Google. (2021d). Minimize technology distractions | Digital Wellbeing. In *Google Digital Wellbeing*. https://wellbeing.google/get-started/minimize-distractions/

Google. (2021e). Unplugging from technology | Digital Wellbeing | Google. In *Google Digital Wellbeing*. https://wellbeing.google/get-started/unplug-more-often/

Google. (n.d.). *A primer on Digital Wellbeing*.

Government Technology Agency of Singapore. (2020, May 30). *Responding to COVID-19 With Tech*. https://www.tech.gov.sg/products-and-services/responding-to-covid-19-with-tech/

Granic, I., Morita, H., & Scholten, H. (2020). Young People's Digital Interactions from a Narrative Identity Perspective: Implications for Mental Health and Wellbeing. *Psychological Inquiry*, *31*(3), 258–270. https://doi.org/10.1080/1047840X.2020.1820225

Gui, M., Fasoli, M., & Carradore, R. (2017). Digital well-being. Developing a new theoretical tool for media literacy research. *Italian Journal of Sociology of Education*, *9*(1), 155–173. https://doi.org/10.14658/pupj-ijse-2017-1-8

Hechanova, M. R. M., & Ortega-Go, R. (2014). The good, the bad and the ugly: Internet use, outcomes and the role of regulation in the Philippines. *Electronic Journal of Information Systems in Developing Countries*, *63*(1). https://doi.org/10.1002/j.1681-4835.2014.tb00453.x

Hill, R., Betts, L. R., & Gardner, S. E. (2015). Older adults experiences and perceptions of digital technology: (Dis)empowerment, wellbeing, and inclusion. *Computers in Human Behavior*, *48*, 415–423. https://doi.org/10.1016/j.chb.2015.01.062

Hoechsmann, M., & DeWaard, H. (2015). Mapping Digital Literacy Policy and Practice in the Canadian Education Landscape. In *MediaSmarts: Canada's Centre for Digital and Media Literacy*. Google. https://doi.org/10.3390/healthcare8040497

International Society for Technology in Education. (2021). *The 5 competencies of digital citizenship*. https://www.iste.org/explore/5-competencies-digital-citizenship

International Society for Technology in Education. (n.d.). *ISTE Standards*. International Society for Technology in Education. https://iste.org/standards

International Telecommunication Union (ITU). (2020). *Digital Skills Assessment Guidebook.* https://academy.itu.int/digital-skills-assessment-guidebook

Jisc. (n.d.). *What is digital capability?*. Retrieved June 2, 2021, from https://www.digitalcapability.jisc.ac.uk/what-is-digital-capability/

Kelm, O., & Dohle, M. (2018). Information, communication and political consumerism: How (online) information and (online) communication influence boycotts and buycotts. *New Media and Society*, *20*(4), 1523–1542. https://doi.org/10.1177/1461444817699842

Kucuk, S. U. (2016). Consumerism in the Digital Age. *Journal of Consumer Affairs*, *50*(3), 515–538. https://doi.org/10.1111/joca.12101

Loe, M. (2010). Doing it my way: old women, technology and wellbeing. *Sociology of Health & Illne*ss, 32, 319-334. https://doi.org/10.1111/j.1467-9566.2009.01220.x

Low, T. Y., So, J. B. Y., Madhavan, K. K., & Hartman, M. (2020). Wellbeing of Surgical Staff since the COVID-19 Pandemic. *British Journal of Surgery*, *107*(11), e478–e478. https://doi.org/10.1002/bjs.11937

Madden, D., Cadet-James, Y., Watkin-Lui, F., & Atkinson, I. (2012). Healing through ICT: Enhancing wellbeing in an Aboriginal community. Journal of Tropical Psychology, 2, E6. doi:10.1017/jtp.2012.8

Makin, S. (2018). Searching for digital technology's effects on well-being. Nature, 563, S138-140. https://doi.org/10.1038/d41586-018-07503-w

Marin, L., & Roeser, S. (2020). Emotions and Digital Well-Being: The Rationalistic Bias of Social Media Design in Online Deliberations. In C. Burr & L. Floridi (Eds.), *Ethics of Digital Well-*

Being: A Multidisciplinary Approach (1st Edition, pp. 139–150). Springer International Publishing.

Marsden, P. (2018, September 18). *Apple launches iOS 12 with suite of digital wellbeing features*. Digitalwellbeing.Org. https://digitalwellbeing.org/apple-launches-ios-12-with-suite-of-digital-wellbeing-features/

Maryland Department of Labor. *Digital Literacy Framework for Adult Learners.* https://www.dllr.state.md.us/gedmd/digitalliteracyframework.pdf

McAfee. (2014). *Intel Education Digital Wellness Curriculum.* https://aim.gov.in/pdf/Digital_Wellness_Curriculum_Learner_Edition_by_Intel.pdf

MediaSmarts. (2015). *Use, Understand & Create: A Digital Literacy Framework for Canadian Schools*. http://mediasmarts.ca/sites/mediasmarts/files/pdfs/digital-literacy-framework.pdf

Medina, V. G., & Todd, R. J. (2019). *Young People's Digital Safety and Wellbeing: Findings from Philippines and Qatar* (S. Kurbanoğlu, S. Špiranec, Y. Ünal, J. Boustany, M. L. Huotari, E. Grassian, D. Mizrachi, & L. Roy (Eds.); pp. 176–187). Springer International Publishing.

Melki, J., & Mallat, S. (2014). Digital Activism: Efficacies and Burdens of Social Media for Civic Activism. *Arab Media and Society*, *19*, 1–15.

Mendes, K., Ringrose, J., & Keller, J. (2019). Introduction. In *Digital Feminist Activism* (pp. 1–23). https://doi.org/10.1093/oso/9780190697846.003.0001

Merry, S. N., Cargo, T., Christie, G., Donkin, L., Hetrick, S., Fleming, T., Holt-Quick, C., Hopkins, S., Stasiak, K., & Warren, J. (2020). Debate: Supporting the mental health of school students in the COVID-19 pandemic in New Zealand – a digital ecosystem approach. *Child and Adolescent Mental Health*, *25*(4), 267–269. https://doi.org/10.1111/camh.12429

Microsoft. (n.d.). *Digital Literacy*. Retrieved May 20, 2021, from https://www.microsoft.com/en-us/digital-literacy

Ministry of Communications and Information (MCI). (2018). *Digital readiness blueprint.* https://www.mci.gov.sg/en/portfolios/digital-readiness/digital-readiness-blueprint

Ministry of Communications and Information (MCI). (2019). *Digital media and information literacy framework.* https://www.mci.gov.sg/literacy/-/media/literacy/library/topic/mci-dmil-framework.ashx

Ministry of Education (MOE). (2020). *Strengthening digital literacy*. https://www.moe.gov.sg/microsites/cos2020/refreshing-ourcurriculum/strengthen-digital-literacy.html

Ministry of Education. (n.d.). *Practising Cyber Wellness*. Ministry of Education Singapore. Retrieved June 2, 2021, from http://www.moe.gov.sg/programmes/cyber-wellness

Monge Roffarello, A., & De Russis, L. (2019). *The Race Towards Digital Wellbeing*. 1–14. https://doi.org/10.1145/3290605.3300616

Nansen, B., Chakraborty, K., Gibbs, L., MacDougall, C., & Vetere, F. (2012). Children and Digital Wellbeing in Australia: Online regulation, conduct and competence. *Journal of Children and Media*, *6*(2), 237–254. https://doi.org/10.1080/17482798.2011.619548

National Institute of Standards and Technology. (2018). *Framework for Improving Critical Infrastructure Cybersecurity*. https://www.nist.gov/cyberframework/framework

Ohlheiser, A. (2021, May 30). The woman behind 'Me Too' knew the power of the phrase when she created it — 10 years ago. *Washington Post*. https://www.washingtonpost.com/news/the-intersect/wp/2017/10/19/the-woman-behind-me-too-knew-the-power-of-the-phrase-when-she-created-it-10-years-ago/

Organisation for Economic Co-operation and Development. (2019a). How's Life in the Digital Age? In *How's Life in the Digital Age?* https://doi.org/10.1787/9789264311800-en

Organisation for Economic Co-operation and Development. (2019b). *How is the digital transformation affecting people's lives?* http://bit.ly/HiL-Digital

Organisation for Economic Co-operation and Development. (2019c). *Well-Being in the Digital Age* (Issue March). https://doi.org/10.1007/978-3-030-00746-1_3

Organisation for Economic Co-operation and Development. (2019d). *How's Life in the Digital Age?: Opportunities and Risks of the Digital Transformation for People's Well-being*. OECD. https://www.oecd.org/publications/how-s-life-in-the-digital-age-9789264311800-en.htm

P. Espenida, E., & Villaflores, R. L. (2019). Effect of Internet Addiction on the Academic Performance of Junior and Senior High School Students of Mapanas Agro-Industrial High School, Mapanas, Northern Samar: University of Eastern Philippines Extension Services Collaborative Output. *International Journal of Humanities and Social Science*, *9*(5), 105–110. https://doi.org/10.30845/ijhss.v9n5p14

Parigi, P., & Gong, R. (2014). From grassroots to digital ties: A case study of a political consumerism movement. *Journal of Consumer Culture*, *14*(2), 236–253. https://doi.org/10.1177/1469540514526280

Park, Y. (2019). *DQ Global Standards Report 2019: Common framework for digital literacy, skills and readiness*. DQ Institute. https://www.dqinstitute.org/wp-content/uploads/2019/03/DQGlobalStandardsReport2019.pdf

Pawluczuk, A., Yates, S.J, Carmi, E., Lockley, E., & Wessels, B. (2020). Data citizenship framework: Exploring citizens' data literacy through data thinking, data doing and data participation. In Marnie, M. (Ed.), *Digital skills insights*. International Telecommunication Union (pp. 60-70). http://collections.unu.edu/view/UNU:8006

Perez, S. (2018, June 5). *Apple unveils a new set of 'digital wellness' features for better managing screen time*. TechCrunch. https://social.techcrunch.com/2018/06/04/apple-unveils-a-new-set-of-digital-wellness-features-for-better-managing-screen-time/

Regan, M., Rooksby, J., Hiniker, A., Munson, S., Lukokff, K., Ciolfi, L., Thieme, A., & Harrison, D. (2019). Designing for Digital Wellbeing: A Research and Practice Agenda. *Topical Conference on Path to Innovation: New Technologies in Decorating and Assembly 2008*, W17 1-8. https://doi.org/10.4324/9781315650616-12

Richardson, J. & Milovidov, E. (2019). *Digital citizenship handbook*. Council of Europe. https://rm.coe.int/16809382f9.

Roffarello, A. M., & Russis L. D. (2021). Coping with Digital Wellbeing in a Multi-Device World. Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems, Yokohama, 1-14. http://dx.doi.org/10.1145%2F3411764.3445076

Sambaraju, R. (2020). "I Would Have Taken This to My Grave, Like Most Women": Reporting Sexual Harassment during the #MeToo movement in India. *Journal of Social Issues*, *76*(3), 603–631. https://doi.org/10.1111/josi.12391

SG Digital. (2020). *Digital Government Blueprint*.

Shin, T. S., Hwang, H., Park, J., Teng, J. X., & Dang, T. (2019). *Digital Kids Asia-Pacific (DKAP)*.

Siegerink, V. (2016). *Well-being in the digital age: Towards a measurement framework for understanding the opportunities and risks of the digital transformation for well-being*. https://composite-indicators.jrc.ec.europa.eu/sites/default/files/02 - Well-being in the digital age - Vincent Siegerink.pdf

Smart Nation and Digital Government Office. (2018). *Smart Nation: The Way Forward*. *November*, 1–34. https://www.smartnation.sg/docs/default-source/default-document-library/smart-nation-strategy_nov2018.pdf

Smith, C. H. (2020). Corporatised Identities ≠ Digital Identities: Algorithmic Filtering on Social Media and the Commercialisation of Presentations of Self. In C. Burr & L. Floridi (Eds.), *Ethics of Digital Well-Being: A Multidisciplinary Approach* (1st ed., pp. 55–80). Springer International Publishing.

Sramova, B., & Pavelka, J. (2019). Gender differences and wellbeing values in adolescent online shopping. *International Journal of Retail and Distribution Management*, *47*(6), 623–642. https://doi.org/10.1108/IJRDM-08-2017-0173

Stefan Baack, S., & Maxwell, M. (2020). *Alternative Data Governance Approaches: Global Landscape Scan and Analysis*. Mozilla. https://assets.mofoprod.net/network/documents/DataGovernanceApproaches.pdf

Sum, A., Mathews, M. R., Pourghasem, M., & Hughes, I. (2008). Internet Technology and Social Capital: How the Internet Affects Seniors' Social Capital and Wellbeing, Journal of Computer-Mediated Communication, 14(1), 202–220. https://doi.org/10.1111/j.1083-6101.2008.01437.x

Svoen, B., Dobson, S., & Bjørge, L. T. (2021). Let's talk and share! Refugees and migrants building social inclusion and wellbeing through digital stories and online learning resources. *International Journal of Inclusive Education*, *25*(1), 94–107. https://doi.org/10.1080/13603116.2019.1678802

Tan, M. K. B., & Tan, C. M. (2021). Curating wellness during a pandemic in Singapore: COVID-19, museums, and digital imagination. *Public Health*, *192*, 68–71. https://doi.org/10.1016/j.puhe.2021.01.006

Thakur, A., & Kang, T. K. (2018). Gender and locale differences in cyber crime awareness among adolescents. In *Indian journal of health and wellbeing* (Vol. 9, Issue 8/9, pp. 906–916). Indian Association of Health, Research and Welfare.

UNESCO. (2019). *Digital Kids Asia-Pacific (DKAP)*. *May*, 171.

Vanden Abeele, M. M. P. (2020). Digital Wellbeing as a Dynamic Construct. *Communication Theory*, *qtaa024*. https://doi.org/10.1093/ct/qtaa024

Vivienne, S. (2016). *Digital identity and everyday activism: sharing private stories with networked publics*. Palgrave Macmillan. https://doi.org/10.1080/1369118x.2016.1211726

Vuorikari, R., Punie, Y., Carretero, S., & Van Den Brande, L. (2016). DigComp 2.0: The Digital Competence Framework for Citizens. In *Jrc-Ipts* (Issue June). https://doi.org/10.2791/11517

World Health Organization. (n.d.). CONSTITUTION OF THE WORLD HEALTH ORGANIZATION. In *World Health Organization*. World Health Organization. https://doi.org/10.11137/2014_2_75_88

Appendix A: List of Gathered Frameworks

Tier 1: International or Supranational frameworks
- APAC Digital Skills Framework
- Apple
- AVERY and EVRYTHNG Digital Emotional Intelligence Framework
- Council of Europe's Digital citizenship handbook
- European Digital Competence Framework (DigComp 2.0)
- European Digital Competence Framework for Consumers (DigComp Consumers)
- Digital Kids Asia Pacific (DKAP)
- DQ Institute Framework
- Google
  - Digital Wellbeing
- Intel
  - Digital Wellness Curriculum
- International Society for Technology in Education
  - Standard for Administrator
  - Standard for Educators
  - Standard for Students
- ITU's Data citizenship framework
- JISC Capabilities Framework
- Microsoft's Digital literacy curriculum
- Mozilla's Web Literacy 2
- Organisation for Economic Co-operation and Development

Tier 2: National frameworks
- British Columbia Digital Citizenship Curriculum
- Canada's MediaSmarts Digital and Media Literacy Framework
- Common Sense Education Digital Citizenship Curriculum
- DIMLF
- INGSA
- Maryland Department of Labor's Digital Literacy Framework for Adult Learners
- Mike Ribble's Digital Citizenship in Schools
- NDLP
- NIST Cybersecurity Framework
- SG Digital Readiness Blueprint
- SG National Digital Literacy programme
- SG Ministry of Education Cyber Wellness Curriculum
- SG Digital Media and Information Literacy Framework
- Unified Framework for Digital Literacy in Singapore (UFDL)

Appendix B: Discussions on other key frameworks

Tier 1 Frameworks

APAC Digital Skills Framework

The APAC Digital Skills Framework is based on the APAC Digital Skills Index that focuses on the level of digital skills used in the workforce across six APAC economies: Australia, India, Indonesia, Japan, Singapore, and South Korea. The APAC Digital Skills Framework aims to offer a consistent definition for digital skills in the region, as well as a coherent basis to assess the existing digital skill utilization and future skill needs in the region. The framework was developed based on a review of existing digital skills frameworks including the United Nations Educational, Scientific and Cultural Organization (UNESCO) Global Digital Literacy Framework and the European Union's (EU) Digital Competence Framework 2.1. The report evaluates digital skills using an index that is based on eight competence areas which are categorized into two groups such as vertical and horizontal competences.

Within this framework, Vertical competences "relate to specific, well-bounded areas of digital expertise that rely on technical knowhow" and it includes "devices and software operations, information and data literacy, digital content or product creation, cloud computing competencies, digital communication and collaboration, and digital problem solving". On the other hand, "horizontal competences relate to cross-cutting digital skills that require to be applied across most digital tasks and involve both technical as well as "soft" skills," and it includes "digital communication and collaboration, digital problem solving, digital security and ethics, and digital project management" (14).

At the same time, the assessment of skills is also based on four proficiency levels, which means the ability levels for the competence. The four levels of proficiency are termed as a digital learner, user, integrator, and innovator. Digital learners are individuals who do not use their awareness about digital tools and activities for economic activity, while 'users' denotes those who make use of digital software and hardware which require various levels of expertise. Integrators are those who can customize digital solutions according to organizational requirements, while innovators use advanced digital expertise and research to develop and create new digital applications. The framework has identified 28 skills to assess the utilisation of digital skills in the

Asia Pacific region. These 28 digital skills match a specific competence area and proficiency level (AlphaBeta, 2021).

Google

Being one of the most influential big tech companies in the world, Google's initiative to introduce measures that promote a person's digital wellbeing, which is about:

[C]rafting and maintaining a healthy relationship with technology…how technology serves us and moves us towards our goals, rather than distracting us, interrupting us or getting in the way…[and] being in control of technology enables us to use its full potential and gain all the benefits of it. (Google, 2018b)

Using this as its gauge, it takes a holistic approach to allow users create meaningful and beneficial relationships with technology while letting them focus on what matters most amid a digitally transforming society (CrashCourse, 2019; Google, 2018b, 2021b, 2021c; Google Developers, 2018). To achieve this, it sees wellbeing not only within its digital aspects such as software and interface design but also its physical aspects as well including spending outside, distancing from gadgets, and become more productive at work (Google, 2018a). Through this philosophy, Google has been implementing user interface and designs that help achieve personal digital wellbeing goals by letting them focus while using it to maximize its benefits (Google, 2018a, 2019b, 2021a), unplug more often from gadgets (Google, 2018a, 2019d, 2021e), minimize distractions (Google, 2018a, 2019c, 2021d), and find balance as a family (Google, 2019a). Aside from these efforts, this software company has taken steps in ensuring its users' safety by coping to their needs. For instance, they have partnered with the International Society for Technology in Education to teach kids on skills that let them learn and acquire skills in digital safety, which would empower them (Google et al., 2019). Google has also published a guide that would help people deal with technology use during the COVID-19 pandemic (Google, 2020). Clearly, Google has comprehensibly examined and combed through possible ways of integrating digital wellbeing in their software and hardware. To some degree however, it is also at the expense of gate fencing their own technologies and innovations. This means looking further into its resource materials could help users understand more about Google's main goal of establishing healthy relationships between humans and technology by striking that balance of using it for its benefits while being protected by its threats at the same time.

Jisc digital capabilities framework

This framework understands digital capability as "the skills and attitudes that individuals and organisations need if they are to thrive in today's world." The framework categorises the capabilities at the individual and organisational levels. At the individual level, these capabilities equip us "to live, learn and work in a digital society," while at the organisational level it denotes "the culture and infrastructure of an institution enables and motivates digital practices."

The Jisc framework defines six elements to understand digital capability at an individual level. The elements include: a) ICT proficiency, b) Information, data and media literacies, c) Digital creation, problem-solving and innovation, d) Digital communication, collaboration and participation, e) Digital learning and development and f) Digital identity and wellbeing.

The framework defines digital wellbeing, one of the elements of digital capability, as one's ability to "look after personal health, safety, relationships and work-life balance in digital settings; use digital tools in pursuit of personal goals and to participate in social and community activities; act safely and responsibly in digital environments; negotiate and resolve conflict; manage digital workload, overload and distraction; act with concern for the human and natural environment when using digital tools" (8).

At the organisational level, the framework focuses on the role of technology in supporting the core functioning of the organisations. The six elements of digital capability at the organisational level include: a) organisational digital culture, b) content and information, c) research and innovation, c) communication, d0 learning, teaching and assessment and e) ICT infrastructure. The framework defines organisational digital culture as the ways an organisation "supports the development of digitally capable people (staff and students) through its core strategies, its administrative structures and processes, and through cultural features such as its leadership, governance and engagement" (Jisc, 2019).

Mozilla's Web Literacy 2.0

Mozilla's *Web Literacy 2.0* is an update of its first Web Literacy Map (2013) that outlined a set of core web literacy skills for effective interaction online. For Mozilla, web literacy means the knowledge one needs to acquire to read, write and participate online. The Web Literacy Map identified a three-step process to web literacy. According to Mozilla, an individual needs to acquire

web skills, which are capabilities that help to perform actions and web competencies, which are "skills for pre-defined purposes" to achieve web literacy.

For Web Literacy 2.0, which features the updated literacy map, Mozilla identifies a set of core web literacy skills: Read, write, and participate. "Read' is an understanding of basic web mechanics and the ability to explore the web using this knowledge, while 'Write' highlights the capacity to create meaningful content. Finally, 'participate' means being part of healthy online communities to interact and create meaningful content safely and securely. In addition, this literacy map offers a set of '21st Century Skills' required to achieve career readiness and workforce development. These skills include collaboration, communication, creativity, and problem-solving. These skills correspond to specific web literacy skills. The combination of 21C and web literacy skills offers entry-level digital-age skills (Chung, Gill, &, O'Byrne, 2016).

Intel - Digital Wellness Curriculum

The Intel Education Digital Wellness Curriculum prepared by McAfee offers four modules:

1. Getting Started with Cyber Wellness

2. Threats to Cyber Wellness

3. Safety for Social Media

4. The Road Ahead

The document defines Cyber Wellness as an active process of becoming aware of, and making choices toward feeling good and safe in our online interaction with others and thereby living a more stress free life (1.3).In addition the curriculum also refers to the definition of cyber wellness by Singapore Media Development Authority, wo refers Cyber Wellness to the positive well-being of Internet users and a healthy cyberculture for the Internet community It is a broad term that is inclusive of Cyber Ethics, Cyber Security and Cyber Safety.

Further, it considers Cyber Wellness as a broad term that is inclusive of Cyber Ethics, Cyber Security and Cyber Safety (1.5).

1. Cyber Ethics- refers to appropriate, responsible, and ethical online behaviour that governs all our interaction with other Internet users and emphasizes on the exercise of cyber values.

2. Cyber Security- refers to the protection of our computer systems, devices and networks from any unauthorized access or misuse by others.

3.   Cyber Safety- refers to following safe practices that minimize the risks of being harmed by the dangerous behaviour of others such as cyber-bullying and stalking.

This document also identifies five values that promote cyber wellness:

1.   Responsibility: Responsibility is being accountable for your behaviour. An example of being responsible as an Internet user would be to play online games only for a fixed and reasonable amount of time.

2.   Respect: To respect others is to have a regard for them and be appreciative of them. An example of being respectful would be to communicate politely with others while writing emails or posting comments on a blog or in a discussion forum.

3.   Compassion: Compassion is a feeling of wanting to help someone in trouble. For example, you are being compassionate, if you are supporting a friend who is being cyber bullied by reporting the act to parents, teachers, or any other person of authority.

4.   Resilience: Resilience is the ability to recover from an undesirable change or incident. An example of being resilient would be to respond appropriately and not give up if you have faced any disturbing experience online.

5.   Integrity: Integrity is the quality of being honest and fair. For example, if you follow copyright regulations and do not copy-paste content from other sources for your school assignments then you are exercising integrity.

The curriculum also lists several threats to Cyber Wellness in the current digital environment and it includes: Gaming addiction, identity theft, Copyright infringement and plagiarism, and malware (McAfee, 2014).

Tier 2 Frameworks

Singapore Digital Media and Information Literacy Framework

The Digital Media and Information Literacy Framework, another step in the Singapore government's effort to build a Smart Nation, aims to guide existing public education efforts in Singapore. The framework focuses on three ways to prepare the people of Singapore to be equipped to seize the opportunities and benefits of digital life. The framework works towards preparing the society to appreciate the way web and digital technology work and its risks as well as possibilities. At the same time, the framework envisages building a basic understanding to use

digital technologies and information responsibly and safely. To achieve these goals, the framework offers five key learning outcomes (LOs):

· LO1 Appreciate the benefits, risks and possibilities that technology can bring

· LO2 Understand how online platforms and digital technologies work

· LO3 Understand how to use information responsibly

· LO4 Understand how to protect oneself on the Internet

· LO5 Understand how to use digital technologies safely and responsibly Digital Media

These five LOs set a common frame for the media and literacy programmes to be designed to achieve the goal of Singapore's digital initiatives. These learning outcomes feature specific objectives and content areas (MCI, 2019).

Unified Framework for Digital Literacy in Singapore (UFDL)

As an effort to address the existing gaps and support Singapore's Digital Readiness Blueprint, the proposed Unified Framework for Digital Literacy in Singapore (UFDL) is aimed at strengthening "policy coherence across different frameworks, programmes, and campaigns" to ensure the existing efforts to enhance the digital competences of Singaporean citizens are harmonised (15). Using a systematic review of national digital literacy frameworks and benchmarking them against major international frameworks, this proposed framework envisions enhancing the digital skills of Singaporeans with no or low ICT abilities, jobseekers, employers, employment services, education, and training institutions. Introducing this framework, the Institute of Policy Studies' working paper notes that the national programmes and campaigns have an emphasis on information literacy and online safety and indicated the importance of focusing on other aspects of digital literacy such as "problem solving, creativity, communication, and collaboration" (26). As a result of this review of the current policy ecosystem, the paper offers three major recommendations. Firstly, the paper proposes a unifying framework that can cover skills in digital content creation and problem solving. Secondly, this paper argues for merging national frameworks for in-school (NDLP) and out-of-school learners (DMIL) for policy coherence and continuity. The review also helped to identify the absence of career-related digital competence and the paper recommended the inclusion of such skills in the unifying framework. To support the third recommendation, the paper has reviewed the existing research on career-related digital competences as mentioned above. The paper proposed a benchmarking of the

UFDL's implementation against the mentioned programmes. This exercise suggests that these programmes don't offer complete coverage for the implementation of the UDFL. Therefore, the paper offers a fourth recommendation to suggest the formulation of a national digital literacy curriculum (Ei, & Soon, 2021).