Digital citizenship education in the Aotearoa New Zealand curriculum: Developing speculative DCE

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https://doi.org/10.18296/cm.0210

Abstract

Digital citizenship education (DCE) is a concept that looks to develop learners as competent, critical, and active participants in digitally connected societies. *The New Zealand Curriculum* (*NZC*) conveys a vision of DCE across subject disciplines, yet digital citizenship is scarcely defined in teaching content or learning objectives. This article reviews existing conceptions of DCE and their position in curricula, before using a postdigital lens to develop a novel conception, *speculative DCE.* This conception is rooted in the need to examine knowledge, issues, and speculative visions of the future through and beyond different subject disciplines. *NZC* and accompanying documents are assessed for their applicability to accommodate different conceptions of DCE. Analysis suggests that the emphasis on a future-focused approach, combined with curriculum integration, has scope for unpacking sociotechnical relations, developing transdisciplinarity, and enacting speculative DCE.

Introduction

Digital citizenship education (DCE) is a concept focused on developing the skills, knowledge and experiences students need to participate in societies where digital technologies are deeply embedded (McGillivray et al., 2016). Different conceptions of DCE are found in national curricula across the world (Ali et al., 2023). In Aotearoa New Zealand, digital citizenship is associated with the future-focused principle that calls for student engagement in citizenship across the curriculum (Ministry of Education, 2015). DCE is particularly associated with technology education, through the digital focused technological areas (Ministry of Education, 2017), and the Social Sciences learning area, as a site of civic and citizenship education (Ministry of Education, 2020a). Both of

these learning areas support developing an understanding of issues in digitally connected societies; however, restricting an exploration of digital issues in isolated subject disciplines limits the innovative potential of DCE (Fawns et al., 2023). *The New Zealand Curriculum* (Ministry of Education, 2015) (*NZC*) also supports curriculum integration as an approach to examine issues across traditional subject or disciplinary boundaries (Arrowsmith & Wood, 2015). For learners to develop as active, innovative, critically conscious digital citizens, there is a need for DCE to engage in learning that moves beyond disciplinary frameworks and empowers learners to consider and envision a multitude of possible futures (Jandrić & Knox, 2022).

This article explores opportunities to enact DCE in *NZC* and how current curriculum policies and frameworks can be used to develop digital citizenship. First, a literature review of affective, behavioural, and cognitive conceptions of DCE is conducted, followed by an examination of the learning areas most commonly associated with different DCE conceptions. After identifying tensions between these existing conceptions of DCE, a postdigital lens is then used to reconceptualise DCE as a means of developing critical consciousness and empowering learners to envision credible, alternative futures through and beyond subject disciplines. This alternative conception of DCE is presented as *speculative DCE*. Analysis of the Aotearoa New Zealand context examines *NZC* and supporting documents. The article concludes by suggesting a combination of future-focused learning and curriculum integration to develop postdigital transdisciplinarity through speculative DCE.

DCE

DCE is a broad concept that emerged due to the increasing reliance on digital technologies to participate socially, civically, academically, and professionally (Pangrazio & Sefton-Green, 2021). Digital technologies are a wide range of devices, spaces, and services that electronically "create, store, process, transmit and display information" (Tulinayo et al., 2018, p. 1). DCE looks to develop the competencies and confidence to use digital technologies that are both tangible, such as computer, tablet, and mobile devices, and intangible, such as the internet and algorithms (Johnson et al., 2022); and awareness of the functionality of digital technologies and their limitations (McCosker, 2016). While it has been asserted that everyone in the digital age is a digital citizen

(Dedebali & Dasdemir, 2019), it is widely acknowledged that digital citizens possess certain qualities. These qualities include digital activism for social justice (Claravall & Evans-Amalu, 2020); political participation online (Vromen, 2017); understanding and respecting digital rights (Pangrazio & Sefton-Green, 2021); and critical literacy in online spaces (Alvarez, 2019). DCE is therefore defined as a concept that seeks out opportunities across subject disciplines to develop learners' awareness of the impact of the digital on the self and wider society (Choi, 2016), while also fostering the skills, experience, and knowledge to act as critically informed citizens in a complex, evolving, digitally connected environment (McGillivray et al., 2016).

In a recent systematic literature review, Richardson et al. (2021) categorise DCE into three conceptions of DCE, affective, behavioural, and cognitive, each with specific intended outcomes. Each of these conceptions is also more closely aligned to an aspect of schooling or a subject area in curricula. The three conceptions will now be used to outline different understandings of DCE alongside relevant criticisms.

Affective DCE

Affective DCE is commonly associated with digital citizenship policies or guidelines that cover appropriate, responsible, and respectful use of digital technologies in schools (O'Mara et al., 2017). This has led to the association of DCE as a measure against cyberbullying (Ali et al., 2023), and as a means of developing digital etiquette (Mangkhang & Kaewpanya, 2021). Additionally, since the pandemic, studies have examined learners' socioemotional wellbeing in relation to their digital habits (Buchholz et al., 2020; Dhawan, 2020). Many of the studies classified as having affective outcomes emphasise attitudes, perceptions, and awareness as key facets of developing socioemotional wellbeing in DCE (Richardson et al., 2021).

By emphasising using digital technologies responsibly, and by respecting moral rules and others' rights and freedoms in digital spaces, affective DCE can enrich participation as a digital citizen. Yet, often affective DCE takes "a didactic approach to scaffolding 'appropriate', 'respectful' and 'responsible' online behaviour" (Pangrazio & Sefton-Green, 2021, p. 22). This has led to affective DCE being enacted through policies that restrict or ban the use of digital technologies (Beneito & Vicente-Chirivella, 2022; Kessel et al., 2020).

As Teschers and Brown (2019) suggest, simply restricting the use of digital technologies might prevent "issues arising during school time and mitigates against the risk for schools, [but] it does not build and develop young people's skills and capabilities in digital technology" (p. 211). In this regard, affective DCE alone does not develop the skills, understanding, and experiences needed for critically informed digital citizenship.

Behavioural DCE

Behavioural DCE endorses a competency-based definition of digital citizenship as a person who can effectively and efficiently use digital technologies (Lewin, 2018). There is an association between digital citizens' behavioural outcomes and students succeeding academically, socially, and professionally (Jackman et al., 2021). In the literature, there is widespread use of Ribble's (2021) nine elements of digital citizenship, which are: digital access; digital commerce; digital communication and collaboration; digital etiquette; digital fluency; digital health and welfare; digital law; digital rights and responsibilities; digital security and privacy. These elements are associated with skills for both civic and workplace participation (Bottino, 2020), which has the potential to increase students' opportunities and possibilities in a digitally connected world (Crow et al., 2019).

Critics of behavioural DCE suggest the perpetuation of techno-normative narratives homogenise understandings of digital citizenship around dominant socioeconomic views (Pangrazio, 2016). The association of digital technologies with performance and efficiency aligns behavioural DCE to labour market workforce demands, rather than rising to the challenges of living in digitally connected societies (Villar-Onrubia et al., 2022). While effective use of digital technologies can be considered a prerequisite to participating as a digital citizen, reducing DCE to a set of prescribed behaviours merely preserves and promotes "the necessary mental conceptions of the world that facilitate productive activity, guide consumer choices and stimulate the creation of new technologies" (Harvey, 2014, p. 100). Rather than truly empowering marginalised learners to envision an equitable, social justice orientated future, behavioural DCE, approached uncritically, reifies a market-orientated vision of the future.

Cognitive DCE

A cognitive conception of DCE emphasises the need to unpack digital technologies' embeddedness and influence across society (Choi, 2016). Much of the literature on cognitive DCE has been produced in response to a perceived lack of criticality in behavioural DCE, and therefore cognitive DCE outcomes are viewed as enriching digital acts (Villar-Onrubia et al., 2022). Specific cognitive outcomes include understanding how digital technologies function (Buchholz et al., 2020); intellectual abilities to select, classify, analyse, interpret, and understand data critically (McGrew & Breakstone, 2023); and acknowledging how digital technologies influence ways of thinking and being (Nos Aldás, 2020). Cognitive DCE can be associated with critical digital citizenship, "where young people are, through practice, asked to ponder how digitally mediated publics operate in the school setting and beyond" (McGillivray et al., 2016, p. 724). While cognitive DCE is underrepresented in the literature in comparison to behavioural and affective DCE (Richardson et al., 2021), the recent explosion of interest in artificial intelligence and the impact of algorithmic systems on the dissemination of knowledge has generated increased literary attention on cognitive DCE (Gillani et al., 2023; Pavlik, 2023).

If behavioural DCE can be criticised for accommodating techno-normative narratives, criticism can be levelled at the cognitive conception of DCE for engendering fatalism through overly pessimistic criticism of digital technologies (Knox, 2015). Cognitive DCE might increase understandings of digital systems; however, that understanding can be debilitating as the greater awareness individuals have of the manipulative, domineering, surveillance of digital technologies, the less likely they are to believe in the possibility of addressing issues associated with digital technologies (Susskind, 2022). It has therefore been argued that approaches to citizenship education need to be rooted, not just in critical thinking, but also optimism and hope (Bourn, 2021). If an objective of cognitive DCE is to unpack the normative structures of digitally connected societies, citizens must also be encouraged to envision how these structures might be reformed (Pangrazio & Sefton-Green, 2021). Educators have a responsibility to address issues in societies by creating a sense of hope through understanding and engendering the skills to take effective social action (Bourn, 2021). This should not be a formulaic, mechanical approach in which learners move from one point of engagement to the next,

but an approach that creates opportunities to envision alternative futures to those perpetuated by dominant narratives.

DCE in the curriculum

Rather than being approached as a stand-alone subject, DCE is "an example of a once-hidden curriculum that is now gaining attention and is pushed to be taught alongside traditional curriculum" (Walters et al., 2019, p. 14). As mentioned, the affective conception of DCE has often found its way into school policies concerning appropriate use of digital technologies in the school setting. Yet, given the increasing awareness of socioemotional issues associated with digital ways of being, affective DCE also underpins disciplinary engagement in DCE (Buchholz et al., 2020). Likewise, behavioural and cognitive conceptions of DCE are viewed as means to enrich subject disciplines (Choi, 2016). A systematic review by Chen et al. (2021) found multidisciplinary interest in DCE; however, there continues to be frequent positioning of DCE in digital technology education and social studies areas of learning.

Digital technology education, also called computing, computer science, or informatics, emphasises computational thinking, cybersecurity, digital creativity, and problem solving (Varoy et al., 2021). A number of countries have subject disciplines dedicated to this area of learning on their national curriculum, whereas other countries integrate learning about digital technologies into other subject disciplines (Stringer et al., 2022). The main focus of this area of learning is to learn about digital technologies, rather than simply learning with digital technologies. Literature associating DCE with digital technology education tends to reflect behavioural DCE, as there is an emphasis on behavioural outcomes such as digital competencies, literacies, and problem solving (Martin et al., 2019). There is also a focus on understanding digital systems and technologies in relation to social issues and real-world problems (Martin et al., 2019). However, critics suggest there is a tendency for digital technology education to perpetuate instrumentalist narratives that relate behavioural outcomes to future success in society and the workplace (Grimus, 2020). This has led to the conclusion that digital technology education "is interwoven with neoliberal false promises for individual upward mobility and the false promise that educational reform on its own can mitigate poverty, economic inequality, and a hierarchical class structure" (Saltman, 2017, p. 82).

Elsewhere, the social sciences, and in particular in social studies lessons, are viewed as a key site for engaging with DCE (Choi, 2016). Social studies has long been viewed as a means for citizenship education due to the emphasis on sociocultural relations and the ways individuals can respond to societal functions (Dilworth, 2004; Hoge, 2002). Being rooted in critical thinking about society, citizenship education is being revised for a world in which students will grow up without knowing what it is like to not be digitally connected (Alvarez, 2019). DCE in social studies can, therefore, "help digital citizens recognize the unequal power relations, challenge the status quo, and reclaim democratic processes for marginalised citizens" (Choi, 2016, p. 582). This engages with both behavioural DCE, in terms of taking action through civic participation, and cognitive DCE, in terms of understanding democratic systems in digitally connected societies. Yet, there has also been criticism of social studies framing action and participation in the confines of the current political and social systems (Magill, 2021; Nelson et al., 2021). In this sense, social studies present opportunities to reflect on digital technologies' impact on ways of being, seeing, and thinking; however, that alone does not open up possibilities for thinking outside of current societal structures of power and civic participation.

Accordingly, given the need to equip learners with a wide scope of skills and knowledge to act critically and consciously in digitally connected societies, engaging students in DCE cannot be confined to a single area of learning and must happen across the curriculum. Frau-Meigs et al. (2017) call for integrating DCE across disciplines, where digital technology education might develop the "hard literacies" of digital citizenship, such as effective use of digital technologies, while the "soft skills" of digital citizenship, such as socioemotional wellbeing and civic participation, are developed elsewhere. Cross-curricula approaches are frequently framed as a means to utilise digital technologies that are now ubiquitous across all learning areas and environments (Crow et al., 2019). However, this does not clearly problematise digital technologies and suggests the possibility of non-selective, deterministic, uncritical approaches to DCE. Instead, there is a need for cross-curricula DCE approaches to question the impact of digital technologies and use different subject disciplines to explore potential, alternative uses of digital technologies.

DCE through a postdigital lens: Speculative DCE

Postdigital philosophy operates at the intersection of theory and practice—it is a "holding-to-account" of digital technologies and a digital way of being (Jandrić & Knox, 2018, p. 895). The postdigital is not an epistemology, or a particular approach to research, but "a way of focusing that situates technology or practices in complexity" (Fawns et al., 2023, p. 16). The postdigital is commonly defined by an understanding that, in complex, digitally connected societies, "technologies permeate all aspects of our being" (Jandrić & Hayes, 2022, p. 324). As such, a postdigital approach seeks to facilitate individual and collective ownership over human-digital technology relations (Jandrić et al., 2018).

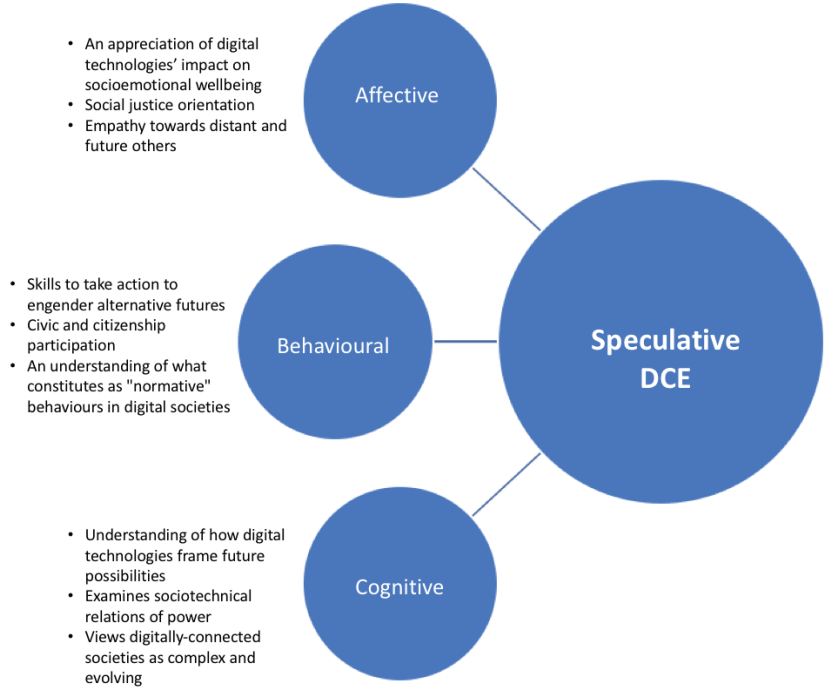
Postdigital theorists advocate for a convergence of knowledge disciplines to examine a holistic view of digital, political, economic, societal, and environmental interconnectivity (Jandrić & Knox, 2022). Understanding digital technologies across this convergence enables the possibility of unpacking sociotechnical relations across disciplinary boundaries. Utilising different disciplinary approaches and ways of knowing presents opportunities to examine dominant, "realistic" futures and engender the possibility of discussing and envisioning alternative ways of being (Ross, 2023). In this regard, Fawns et al. (2023) suggest that postdigital transdisciplinarity can:

> help us to look for risks, potential harms, and ethical complexity and also positive ways to engage with technology such that the emergent activity aligns with the values and purposes of different stakeholders … Such negotiation of views, disciplines, and contexts has great potential for people to learn from others and, individually and collectively, to expand their horizons. (p. 14)

Therefore, a postdigital lens can enrich DCE by unpacking complex sociotechnical relations, where digital technologies have become intertwined with power and dominant ways of being (Susskind, 2022). In this sense, DCE through a postdigital lens engages with the messy sociotechnical relations that constitute education (Jandrić & Knox, 2022). The use of digital technologies is not necessarily required to examine human-digital technology relations, and, in some cases, DCE can actually be hindered by the use of digital technologies (Selwyn & Aagaard, 2021). Rather, a postdigital approach to DCE raises awareness of the impact of the digital on the individual and wider society, and fosters skills that enable students to utilise digital technologies in a harmonious, progressive, future, and community-focused manner.

A postdigital understanding of DCE incorporates affective, behavioural, and cognitive conceptions of DCE in the generation of a speculative DCE conception. Figure 1 identifies features of the affective, behavioural, and cognitive conceptions in relation to how they can support the development of speculative DCE. While Figure 1 is useful to identify and map connections between existing DCE conceptions and how they might support the development of speculative DCE approaches, it is not a conclusive picture of the speculative DCE conception. Speculative DCE, by name and nature, engages in speculation about power, ways of being, and justice in future (digital) societies. Speculative DCE is therefore simultaneously rooted in examining the foundations of existing power dynamics and envisioning alternative, equitable futures.

Figure 1. Interplay of affective, behavioural, cognitive, and speculative DCE



Note: Figure was developed by the author using conceptions of DCE as outlined by Richardson et al. (2021).

Speculative DCE is therefore rooted in critically examining the impact of digital technologies on ways of being; scrutinising dominant narratives associated with digital technologies, particularly those that uncritically propagate positive, techno-normative views; and a belief in individual and collective agency to address social injustices, redress historical power inequalities, and participate in the shared vision of a better future. There is a danger, however, of enacting practices that both reduce complexity of the present world to imagine future possibilities and limit the plurality of visions of the future (Amsler & Facer, 2017). Speculative DCE therefore views the future as a place of uncertainty and uses that uncertainty creatively in the present.

As a transdisciplinary approach, speculative DCE cross-fertilises different disciplinary perspectives and traditions to produce something beyond the scope of existing disciplinary frameworks (Ross, 2023). Crucially, a speculative approach should not foster simple cause and effect hypotheses; rather, speculative DCE needs to view the world as a complex interrelationship between a multitude of elements. Learners can only adapt themselves to society when they understand the complexity of their realities through a variety of lenses and perspectives (Dedebali & Dasdemir, 2019). In this sense, speculative DCE uses methods and methodologies from different subject disciplines to discuss, envision, and reflect on a range of alternative possible futures (Fawns et al., 2023). This enables learners to situate issues in a range of disciplinary realities, while also speculating outside of disciplinary knowledge to envision possible alternative future realities that exist beyond subject disciplines (Ross, 2023). This grounds speculative DCE in learners' relatable experiences, while also helping to map out hopeful, creative, credible, and achievable visions of the future.

For DCE to effectively engage with the complex, evolving digitally connected societies of the present and future, there is a need to look beyond existing ways of knowing and being. Speculative DCE offers a means to integrate a postdigital agenda into DCE by examining current realities and imagining alternative futures. Speculative DCE can be employed by building on existing DCE narratives that are embedded in curricula around the world. This article will now examine how speculative DCE can be enacted in the Aotearoa New Zealand context.

DCE in the Aotearoa New Zealand context

In Aotearoa New Zealand, children start school between the age of 5 and 6 (Year 1) and finish school between the age of 17 and 18 (Year 13) (Ministry of Education, 2022a). Throughout this time, state schools adopt either the English-medium *NZC* or the Māori-medium *Te Marautanga o Aotearoa* (*TMOA*) curriculum. These curricula were developed independently of one another, and are not translations of each other, but they have an overlapping vision that "every New Zealander … is an active participant and citizen in creating a strong civil society" (Ministry of Education, 2018a, para. 3). Both *NZC* and *TMOA* are divided into three sections. The first section describes the values, guiding principles, key competencies, and learning areas; the second part offers a guide to effective pedagogy, assessment, and curriculum design; the third part outlines the achievement objectives at each level across the different learning areas. Although *NZC* and *TMOA* are compulsory curricula in state-funded schools, each school has autonomy over how they implement the curriculum (Ministry of Education, 2015). Therefore, curriculum documents are not intended to be prescriptive; instead, they offer a framework for teaching and learning.

NZC has been described as an integrated, holistic, yet open-ended curriculum, which affords schools a high amount of autonomy to determine how to enact *NZC* (Adaspayeva & Parkes, 2020). *NZC* acts as a framework for the values, vision, and competencies that reflect "industry-led agendas ... [which] have a new emphasis on the kind of person they want to be formed" (Hughson, 2022, p. 55). In regards to digital citizenship, the stated aim by the Ministry of Education (2023a) is to "to nurture and teach our young people to become discerning, responsible digital citizens" (para. 2). This aim is encompassed within a commitment to future-focused learning and 21st century skills development, which encourages "students to look to the future by exploring such significant future-focused issues as sustainability, citizenship, enterprise, and globalisation" (Ministry of Education, 2015, p. 9). This is reflected in the Technology learning area, which calls for learners to:

> learn to critique the impact of technology on societies and the environment and to explore how developments and outcomes are valued by different people in different times. As they do so, they come to appreciate the socially embedded nature of technology and become increasingly able to engage with current

> and historical issues and to explore future scenarios. (Ministry of Education, 2015, p. 32)

A sociotechnical emphasis was reiterated with the introduction of a focus on digital technologies in the curriculum in 2017. The new focus encouraged "teaching students the theory of how digital technologies work and how they can use that knowledge to solve problems" (Ministry of Education, 2017, p. 5). Digital technology education in Aotearoa New Zealand is not a stand-alone subject but instead integrated into other learning areas, mainly the Technology learning area, as two of the five technological areas that make up Technology are focused on the use and understanding of digital technologies: computational thinking for digital technologies, designing and developing digital outcomes (Ministry of Education, 2017). However, the update encourages schools to consider how learning can incorporate questions pertinent to digital societies "across the curriculum to create rich and culturally responsive learning opportunities" (Ministry of Education, 2017, p. 3). Each learning area offers distinctive opportunities to engage with DCE. For example, in the Arts learning area, there is scope to examine the role of AI in creating and altering images, videos, and audio to mislead or deceive digital users. Another example, this time from Learning Languages, would be to examine the extent to which digital language software can capture accurate meaning or cultural perspectives in translation outputs. Although there is not sufficient space in this article to list the various ways DCE can be integrated into all of the learning areas, these examples highlight that DCE is not limited to a single learning area (Crow et al., 2019).

Therefore, rather than using *NZC* learning areas as a framework for analysis, affective, behavioural, cognitive, and speculative DCE conceptions are used to analyse *NZC* and associated documents, such as *Digital Technologies and the New Zealand Curriculum* (Ministry of Education, 2017) and *Civics and Citizenship Education* (Ministry of Education, 2020a), as well as online teacher education guidelines, such as those presented on the *Te Kete Ipurangi* (Ministry of Education, 2023b) website. These documents and resources were selected from Ministry of Education resource pages based on their applicability to the themes of DCE. Analysis proposes potential avenues for engaging in DCE. Table 1 highlights the position of the affective, behavioural, cognitive, and speculative conceptions in *NZC*.

Table 1 *DCE Conceptions Position in the New Zealand Curriculum*

Conception of DCE	Description	Literature	Position in New Zealand Curriculum
Affective DCE	Appropriate, responsible, and respectful use of digital technologies. Develops the awareness needed to foster socioemotional wellbeing in digitally connected societies.	Anghel et al. (2020) Buchholz et al. (2020) Mangkhang and Kaewpanya (2021) Dhawan (2020) O'Mara et al. (2017) Ribble and Park (2022)	School policies; classroom guidelines; rules for digital device use. Usually whole-school approach and shaped by school culture.
Behavioural DCE	Competencies, skills, and confidence to effectively and efficiently use digital technologies. Associated with the "hard skills" of digital citizenship. Usually instrumental, didactic approaches to engender skills for workplace and societal participation.	Bottino (2020) Vromen (2017) Jones and Mitchell (2016) Lewin (2018) Pedersen et al. (2018) Ribble (2021)	Understanding how to use digital technologies is a main focus of technology education. Emphasis on agential political and social action also a feature of the Social Sciences learning area.
Cognitive DCE	Developing an understanding of how digital technologies work, affect social systems, and frame ways of being. Associated with the "soft skills" of digital citizenship. Often interpreted as critical literacy abilities to select, classify, analyse, interpret, and understand data critically.	Alvarez (2019) Mañero (2020) McGillivray et al. (2016) McGrew & Breakstone (2023) Nos Aldás (2020) Pangrazio and Sefton-Green (2021)	Examining the role of digital technologies in society and developing critical literacy are emphasised in the Social Sciences learning area. Understanding how digital technologies work and how they frame data is a feature in technology education.
Speculative DCE	Innovative, creative, and critical thinking for imagining a variety of alternative, digital futures. Visions of the future can be framed as both hopeful and perilous. Transformation orientated.	Bourn (2021) Fawns et al. (2023) Jandrić and Knox (2022) Ross (2023) Sorte and Vicentini (2020)	Transdisciplinary approach/ curriculum integration. Disciplinary knowledge roots ideas and visions in existing understanding; but then, crucially, moves beyond disciplinary knowledge to produce new ways of seeing, thinking, and being.

Note: Table was constructed by the author using a range of sources cited in the table.

Affective DCE in the Aotearoa New Zealand context

Affective DCE is reflected in the aim of the Ministry of Education (2023a) to "nurture and teach our young people to become discerning, responsible digital citizens" (para. 2). As a basis for ensuring learners' safety and harmonious participation online, schools and teachers are encouraged to integrate digital technologies into educational environments using a Learn, Guide, Protect (LGP) framework (Matthews, 2016). This is framework was developed by Netsafe (2023), an independent, non-profit organisation in the digital education sector that features in the digital citizenship online modules provided by the Ministry of Education (2023a). The LGP framework is "based on the assumption that protective measures are more important and effective for younger people" (Netsafe, 2023, para. 3). The LGP framework covers the following aims:

- Learn: Students develop the competencies and values to keep themselves and others safe online—promote; and
- Guide: The programmes, practice and resources put in place to support student learning and develop a culture of positive digital technology at school and in the wider community—promote; and
- Protect: Technical methods to restrict or monitor online access and school developed policies that underpin a safe and secure digital learning environment.

(Netsafe, 2023, para. 2)

Another resource reflecting affective DCE is the *Statement of National Education and Learning Priorities* (Ministry of Education, 2020b). This document outlines a requirement that "places of learning are safe, inclusive and free from racism, discrimination and bullying" (p. 1). In schools, the enactment of affective DCE has resulted in the widespread adoption of cybersafety policies and guidelines (Estellés et al., 2023). Research conducted by Johnson et al. (2017) reported that more than 70% of New Zealand principals reported that their school have the following strategies for digital technology use:

- Acceptable use agreements with students and/or staff (91%)
- Educating students to develop positive and ethnical online behaviours (82%)
- A digital citizenship policy (73%)

- Engaging with parents and whānau (71%)
- Two thirds of principals also reported that their school provides teachers with digital citizenship resources and professional development (67%).

(Johnson et al., 2017, p. 56)

Accordingly, affective DCE is most prominently enacted in school policies and guidelines that outline responsible use of digital technologies in Aotearoa New Zealand. The trend of adopting digital policies in schools is likely to continue as the Ministry of Education discusses the uses of ChatGPT in the Aotearoa New Zealand context, which may lead to eventually blocking its use (Nicol-Williams, 2023). While well intentioned, there is concern that policies can restrict understanding and the development of behavioural management skills (Estellés et al., 2023). Without further guidance or engagement, such policies ultimately do not empower learners as critically informed digital citizens.

Behavioural DCE in the Aotearoa New Zealand context

In line with wider DCE literature, behavioural DCE is mostly reflected in the emphasis on skills development and practical, vocational usage of digital technologies in the Technology learning area (Kellow, 2018). The two new technological areas—computational thinking for digital technologies and designing and developing digital outcomes—reflect behavioural DCE given their emphasis on competent and confident use of digital technologies to address tasks and solve problems (Ministry of Education, 2018b). These areas focus on developing learners as both users and creators of digital technologies, in order to equip them with the skills to "participate in society as informed citizens and provide a platform for technology-related careers" (Ministry of Education, 2018b, p. 1). As such, technology education is orientated to behavioural DCE by focusing on understanding how digital technologies work in order for learners to be capable of designing and developing their own digital solutions.

Furthermore, behavioural DCE is reflected in the emphasis on civic participation in the Social Science learning area. Teachers are encouraged to develop learners' capacity to participate as citizens by explaining "the ways people can contribute to political decision-making" (Ministry of Education, 2020a, p. 44). The *Civic and Citizenship Education* (Ministry of Education, 2020a) guide notes active participation as a key tenet of citizenship education,

in which learners have "an active role to play in community decision-making and are not simply 'citizens in waiting'" (p. 5). This opens up space for examining civic participation in digitally connected societies considering, as Kane and Parkin (2016) argue, digital technologies have a crucial role in developing civic participation and online behaviours. Enacting behavioural DCE in the Social Science learning area might therefore include exploring and practising using official political channels, such as signing a digital petition, or using social platforms to spread awareness of a topic—both of which are referenced as components on the new curriculum refresh of the Social Sciences learning area (Ministry of Education, 2022b).

Accordingly, behavioural DCE aligns with elements in both the Technology and the Social Sciences learning areas. Research has shown that behavioural DCE is finding a way into schools' teaching practices, as 80% of principals believe that more than half of their school's students will leave secondary school with sufficient digital skills to participate in society (Johnson et al., 2017). This is likely to have increased given the heightened focus on digital technologies in the curriculum and the emphasis on developing learning as competent users and creators of digital technologies (Crow et al., 2019). Yet, while effective use of digital technologies can be considered a prerequisite to participating as a digital citizen, regarding digital citizenship as purely behavioural fails to problematise the influence of digital technologies on ways of being (Alvarez, 2019). This links behavioural DCE to economic growth, notions of progress, and an imagined, techno-normative workplace of the future (Saltman, 2017). Furthermore, the association of behavioural DCE to civic participation within established structures overlooks the potential to use digital platforms and mediums that exist outside of formal channels to create transformational, counter-hegemonic change (Choi, 2016). Therefore, behavioural DCE in *NZC* reflects concerns in the international literature that emphasising techno-normative narratives does not effectively problematise the influence of the digital on ways of being and thinking.

Cognitive DCE in the Aotearoa New Zealand context

Cognitive DCE is emphasised in the calls to engage learners in critical digital literacy in the Social Science learning area, and in developing an understanding of digital technologies in technology education. Civic education policies

encourage a social inquiry process, which includes actively finding out information "by developing an in-depth understanding of an issue, asking questions, evaluating sources, and processing and communicating ideas" (Ministry of Education, 2020a, p. 9). *NZC* (2015) suggests that, in social sciences:

> students develop the knowledge and skills to enable them to: better understand, participate in, and contribute to the local, national, and global communities in which they live and work; engage critically with societal issues; and evaluate the sustainability of alternative social, economic, political, and environmental practices. (p. 30)

The social studies curriculum therefore offers space to problematise digital ways of being by unpacking the influence of digital technologies on identity, communities, and economic developments. This reflects literature that calls for examining the embeddedness of digital technologies into society and their influence over ways of being (Choi, 2016; Mañero, 2020).

In technology education, the two technological areas associated with digital technologies emphasise moving from learning *with* digital technologies, such as using digital hardware or software, to learning *about* technologies, where learners develop "the skills, knowledge and capabilities needed to understand and innovate to come up with digital technologies solutions" (Ministry of Education, 2018c, para. 2). The aim of cognitive DCE in technology education is therefore to "develop as digitally capable thinkers, producers, and creators" (Ministry of Education, 2017, p. 3). This reflects calls in the literature for cognitive DCE to enrich digital acts (McGrew & Breakstone, 2023; Villar-Onrubia et al., 2022).

Thus, like behavioural DCE, cognitive DCE is reflected in both the Social Sciences and the Technology learning areas. *NZC* presents scope to facilitate engagement in critical approaches that problematise power, frames of reference, and ways of being in digital societies. However, studies show that there is a prevailing focus on teaching fact-based and explanatory lessons (Wood & Milligan, 2016), and that teachers are somewhat reluctant to implement approaches that envision hopeful, yet still critical, alternatives to the status quo (Adaspayeva & Parkes, 2020). It is not enough to just critically examine digital technologies' role in perpetuating issues of power and injustice in society; learners

also need to develop an understanding of creative, innovative, alternative ways of being with digital technologies (McGillivray et al., 2016). Thus, for DCE to avoid fatalistic, passive outcomes, there is a need to identify critical spaces in the curriculum to empower learners towards transformative outcomes.

Speculative DCE in the Aotearoa New Zealand context

The emphasis on future-focused learning in *NZC* offers a foundation to enact speculative DCE. Future-focused issues, such as sustainability, citizenship, enterprise, and globalisation, are viewed as key points to engage learners and to make connections across learning areas (Ministry of Education, 2015). A future-focused approach is viewed as a means to "better equip learners with the 21st century skills and competencies that are critical for New Zealand's future economic and social prosperity" (Johnson et al., 2017, p. 111). Both the Technology and the Social Sciences learning areas portray future-focused learning as the examination of the past and the present in order to imagine possible futures (Ministry of Education, 2015). This aligns with speculative DCE's focus on scrutinising historically rooted dominant narratives about digital technologies and envisioning ways to create a better, equitable, alternative future.

Future-focused learning is viewed as a cross-curricula approach, with schools encouraged to "organise their curriculum around central themes, integrating … across a number of learning areas … [and] wherever possible, schools should aim to design their curriculum so that learning crosses apparent boundaries" (Ministry of Education, 2015, pp. 37–38). Accordingly, curriculum integration, an approach that views subjects as interconnected and engages learners in an active process of decision making on an issue, has been suggested as an educational approach for a complex, rapidly changing digital world (McPhail, 2018). In their study of curriculum integration schools, Arrowsmith and Wood (2015) found that "moving beyond single-subject boundaries was fundamental to the students gaining a deeper understanding of knowledge and the 'real' world" (p. 61). This approach is supported by Reinsfield (2020a), who found that, when examining global issues, accommodating multiple learning areas generated an appreciation for the practical nature of learning. This analysis suggests that speculative DCE might be enacted through examining issues in the context of the wider sociotechnical environment across learning

areas. By guiding students to examine issues through disciplinary knowledge, and exposing the limitations of each disciplinary framework, curriculum integration both grounds issues in existing ways of knowing and opens up critical spaces to envision possible alternative ways of knowing.

Thus, taken together, a curriculum integration and future-focused approach can facilitate a speculative DCE approach. Yet, the absence of adopting both approaches presents a danger that speculative DCE is not enacted and instead reifies existing, normative visions of the future. First, only adopting a future-focused approach, and speculating about the future in one disciplinary framework, confines future possibilities to a narrow, rigid view that potentially overlooks plausible future dangers that might be revealed in other disciplines (Selwyn, 2018). Secondly, to only adopt a curriculum integration approach frames issues and learning outcomes in our present understanding which overlooks our responsibility to the future and to the people, objects, and practices impacted by what we believe is possible (Ross, 2023). Only when both approaches are adopted simultaneously can teaching and learning produce new knowledge for complex, digital future societies (Fawns et al., 2023). In essence, it is important to ask what future possibilities are and whose future is that. Accordingly, in the Aotearoa New Zealand context, speculative DCE is positioned at the intersection of both future-focused and curriculum integration approaches.

Moving forward: Conclusion and future development

This article has mapped out existing literature on affective, behavioural, and cognitive conceptions of DCE and used postdigital theory to formulate a new conception, speculative DCE. Analysis of *NZC* and supporting documents reveals avenues for facilitating DCE in its various conceptions. Therefore, moving forward, the question is not how to make space for DCE in *NZC*—*NZC* affords space for affective, behavioural, cognitive, and even some aspects of speculative DCE—but rather how to develop existing curriculum spaces to empower learners as critical, future-focused, innovative digital citizens.

Despite curriculum integration being a potential facilitator of speculative DCE, there is very little guidance about how to implement it (Arrowsmith & Wood, 2015; McPhail, 2018). Studies have shown that successful implementation of *NZC* reforms usually include clear, accessible education policy documents

alongside additional training and support (Buntting, 2021; Estellés et al., 2022). Findings by Reinsfield (2020b) suggest that, while curricula provide opportunities to implement long-term goals, such as future-focused education, teachers' understanding of concepts is shaped by policy and curriculum discourse. Therefore, while this article has highlighted how the different conceptions are represented in *NZC*, further emphasis on combining both future-focused and curriculum integration approaches in policy documents is needed to enact speculative DCE. Global and digital issues present opportunities to engage students in "an authentic purpose—a tangible problem for which the students can create a solution" (Ministry of Education, 2017, p. 5). This emphasis creates the possibility of mixing disciplinary methods with speculative methods to move beyond existing knowledge frameworks, to imagine otherwise, and to produce new, innovative knowledge for digital futures.

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