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RESEARCH PAPER

Personal Responsibility and Beyond

Developing a Comprehensive Conceptualization of Digital Citizenship Competences

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ABSTRACT

As digital transformation reshapes society, it is crucial to understand the evolving demands on education to prepare individuals for this new reality. Although the conceptualizations and objectives vary, digital citizenship education (DCE) typically aims to equip individuals with the competencies necessary not just to thrive in digital and democratic societies but also to critically analyze and actively shape them. However, existing efforts often focus too narrowly on technical skills and online safety, overlooking the broader notion of citizenship in educational contexts. This article addresses this gap by examining the conceptualization of citizenship within the field of DCE, led primarily by the structure of Choi's (2016) concept analysis, and proposing a more comprehensive framework based on the citizenship ideals by Westheimer and Kahne (2004). Drawing on existing frameworks and synthesizing various DCE approaches, the article presents the *Integrated Framework of Abilities for Digital Citizenship (Infra-DC)*. We then examine existing measurement instruments to determine their alignment with the proposed framework. This conceptual work contributes to advancing DCE efforts by promoting a nuanced understanding of citizenship and providing guidance for future research, program development, and evaluation.

1 Introduction

As modern societies continue to undergo a digital transformation, it is imperative to acknowledge the growing necessity for education to equip individuals for the new reality. In their publication for the Council of Europe, Richardson and Milovidov (2022) defined a *digital citizen* as "someone who, through the development of a broad range of competences, is able to actively, positively and responsibly engage in both on and offline communities, whether local, national or global" (p. 11). *Digital citizenship education* (DCE) is often understood as aiming to empower individuals with the essential competencies they need to thrive in digital and democratic societies while fostering their ability to contribute to the shaping and advancement of democratic principles and practice (e.g., Choi, 2016; Richardson & Milovidov, 2022; Vuorikari et al., 2022). It holds special significance for the younger demographic, particularly adolescents, as this stage of development is pivotal in shaping political identity (Meeus, 2011; Rekker et al., 2017).

Recognizing the significance of DCE, various stakeholders have undertaken efforts ranging from the implementation of competence frameworks (Richardson & Milovidov, 2022; Vuorikari et al., 2022), curricula (Ministry of Education Singapore, n.d.) and guidelines (Common Sense, n.d.; MediaSmarts, n.d.; Netsafe, 2007; NYC Public Schools, n.d.) to the organization of initiatives such as Be Internet Awesome (Google, n.d.).

The impacts of these efforts and the methodologies they employ exhibit considerable diversity and variability. Achieving consensus on the overarching domains and objectives of DCE – such as safety and well-being and civic and political engagement – and the specific skills it encompasses remains a challenge (Chen, 2021; Cortesi et al., 2020). Criticism within educational research suggests that DCE efforts often rely on an overly simplistic conceptualization of citizenship (Choi, 2016; Heath, 2018; Pangrazio & Sefton-Green, 2021). According to these critiques, the specified aspects of DCE covered tend to prioritize what are perceived as mere "digital" elements, such as online safety, technical skills, and digital competence, at the expense of the broader notion of citizenship.

As understanding the multifaceted nature of citizenship is essential for developing effective DCE programs, it is crucial to explore the concept of citizenship more deeply in order to examine DCE in the context of traditional citizenship education. Against this background, this article pursues three main objectives. First, it examines existing frameworks and approaches to DCE through the lens of their underlying conceptualizations of citizenship. It aims to investigate the extent to which distinct aspects of DCE are implemented to promote alignment with different ideals of citizenship. Building upon this analysis and a synthesis of four DCE frameworks, the second section of the article presents

a new comprehensive framework. This framework aims to integrate essential dimensions of citizenship-related skills in a manner that encompasses diverse concepts of citizenship, thus providing a broad and inclusive understanding.

The evaluation of existing programs and initiatives is crucial in the advancement of DCE efforts. Therefore, the third section of this article determines the extent to which the dimensions of citizenship-related skills identified as essential are reflected in existing DCE measurement instruments. Lastly, we draw conclusions from this analysis and provide a forward-looking perspective, identifying potential avenues for future research in this field.

2 Exploring Dimensions of Digital Citizenship: Citizenship Aspects in the Digital Realm

2.1 The Citizenship Aspect in Digital Citizenship

The concept of *digital citizenship* (DC) has gained increasing importance among academics and policymakers alike, serving as a focal point for debate and theorization regarding the skills youth need to navigate and engage in the digital world (Cortesi et al., 2020). The multifaceted understanding of DC has scholarly roots in a diverse array of disciplines: education, psychology, political science, sociology, law, media studies, and technology (Chen et al., 2021).[1] Amid a wide variety of different interpretations, an often-cited definition by Mossberger et al. (2008) succinctly frames DC as "the ability to participate in society online" (p. 1).

This definition draws upon the concept of traditional citizenship, which grants members of a community civil, political, and social rights, reimagining it to suit a context in which information technology has become an integral part of societal norms. It is based on a combination of different notions of citizenship, including an individualized-liberal and tendentially economically oriented view that emphasizes equal access opportunities, a democratic-republican notion that places participation in a political community at the forefront, and, to a lesser degree, an inclusive and hierarchy-critical conceptualization that centers on the dismantling of injustice (Mossberger et al., 2008). However, in their elaboration, the last of these conceptualizations is primarily perceived in terms of disparities in access to digital spaces, which reflect unequal opportunities.

[1] For instance, an interpretation of DC that is grounded strongly in questions of law and legality can be relatively far removed from most current DCE efforts. In this view, DC refers to governments' relationships with their constituents in the digital age (Calzada, 2022). In this context, it serves as a conceptual tool to analyze how technology and data are transforming the nature of citizenship at a systemic and political level. This perspective contrasts with a more person-centered understanding that often forms the basis for DCE.

The distinctions drawn between various notions of citizenship shed light on the philosophical underpinnings that guide diverse societal approaches to implementing citizenship. Other categorization schemes focus more closely on how civic education programs – operating at the individual level and aimed at the daily practice of citizenship – can be uniquely characterized. Veugelers (2007) and Westheimer and Kahne (2004) are notable advocates for these categorizations of citizenship, focusing on how civic education shapes individual engagement in society. The three citizenship types outlined by Veugelers (2007) are particularly informative because they bridge the gap between the philosophical underpinnings and the tangible, practical aspects of individual participation in citizenship. Each citizenship type is grounded in different political theories. For the *individual citizen*, personal autonomy and the development of individual values take precedence over social ties. In contrast, the adaptive citizen aligns with communitarian political theory. The subordination of oneself to existing values is characteristic of this type of citizen, although the component of activity for the community is less prominent. The third type – *the critical democratic citizen* – prioritizes autonomy, social awareness, and the development of critical thinking, care, and solidarity values, while placing less emphasis on discipline. These citizens strive to challenge prevailing social, political, and cultural norms and structures, fostering intellectual and social qualities and attitudes.

By evaluating DCE programs in American schools, Westheimer and Kahne (2004) identified three distinct types of citizenship based on individuals' levels of engagement and responsibility within society. *Personally responsible citizens* are individuals who embody positive character traits and engage in law-abiding activities within their communities. While they actively participate in civic affairs and social life at various levels of the community, they typically refrain from challenging or altering existing social structures. In contrast, *participatory citizens* take a more active stance within established systems and may assume leadership roles in civil society frameworks. They engage in decision-making processes and participate in various forms of civic engagement beyond mere compliance with regulations. Finally, justice-oriented citizens go beyond mere participation to actively question prevailing societal structures and strive to rectify injustices. They analyze and understand the interplay of social, economic, and political forces, paying explicit attention to issues of injustice and social justice. These individuals not only ask questions but also take action based on their findings, promoting their goals in political arenas to effect systemic change and cultivate a fairer and more equitable society.

Despite the differing emphases of these two typologies, each includes one type *(critical democratic citizen and justice-oriented citizen)* aligned with critical theory, aiming to understand and critique society, particularly in terms of power structures, inequality, and social injustice. In a related vein, Banks (2008) introduced the concept of transformative citizens, which accentuates multicultural perspectives and underscores the imperative for societal structural shifts, particularly in multicultural societies and educational settings.

Transformative citizens not only acknowledge and respect cultural diversity but also advocate ardently for systemic changes to redress issues of inequality and discrimination within society.

The subsequent elaboration of the DC construct in this paper will be conducted primarily through the lens of Westheimer and Kahne's (2004) typology, as its empirical derivation makes it a better-suited choice for our subsequent search for an empirical instrument.

2.2 Four Categories Constituting Digital Citizenship

In her highly cited concept analysis of digital citizenship for democratic citizenship education in the internet age, Choi (2016) classed the ways DC is commonly understood into four major categories. This section derives each of the four categories – *DC as Ethics, DC as Media and Information Literacy, DC as Participation/Engagement, and DC as Critical Resistance* – from Choi's analysis of existing DC conceptualizations, presenting and discussing with respect to recent examples and newer contributions to the debate. Additionally, we will relate these categories with the three forms of citizenship outlined by Westheimer and Kahne (2004). Although the linkage between the four categories and three types of citizenship can be complex and nuanced, our discussion will advance toward proposing an integrative framework that aligns each category with the type of citizenship it predominantly embodies.

Digital Citizenship as Ethics

The category Digital Citizenship as Ethics encompasses how internet users "appropriately, safely, ethically, and responsibly" participate and engage in digital activities (Choi, 2016, p. 9). The sub-themes Choi identified in her analysis were *safe, responsible, and ethical use of technology and the internet; digital awareness;*[2] *and digital rights and responsibilities* (p. 9). Perspectives on ethics and behavioral norms have an influential role as the foundation for educational initiatives like Google's *Be Internet Awesome* initiative and Singapore's Cyber Wellness curriculum, both of which emphasize safety and responsible behavior online and link digital skills with norm-oriented behavior for protection against assault and rule-breaking.

[2] Awareness means that citizens need to remain cognizant of the political, social, cultural, economic, and educational implications arising from the widespread integration of digital technologies into their daily routines.

Approaches of this kind are primarily based on the rules for online conduct identified by Ribble et al. (2004) and Ribble and Bailey (2007), which range from online etiquette to knowledge about online rights and online safety.[3] The conduct- and safety-oriented understanding of DC, particularly in the earlier works of Ribble and Bailey (e.g. Ribble et al., 2004), reflects the change in public attitudes toward young people's online engagement that was ongoing at the time the papers were published. The late 1990s were characterized by a prevailing optimism about the emancipatory possibilities of online activities that viewed formal education as an artificial aberration in a more spontaneous process of digital learning and expression (Dishon, 2020). However, following a progressive disenchantment with this belief, coupled with a growing awareness of the negative aspects associated with the digital world, a more cautious approach has taken root in recent years. This new approach highlights the role of formal education in safeguarding citizens from the dangers of an unregulated "digital jungle" (Dishon, 2020, p. 146). Thus, the focus on online conduct in DCE has been reinforced by growing concerns about harmful online behaviors such as cyberbullying and the spreading of misinformation (Jones et al., 2013).

Conduct-oriented perspectives have drawn criticism for what their critics see as their inherent conservatism and reduction of citizenship to "appropriate" behaviors or the act of staying safe online (Heath, 2018; Pangrazio & Sefton-Green, 2021). This focus may also have exclusionary effects. For instance, appeals to online politeness may advantage girls in the assessment of behaviors related to DC yet simultaneously strip them of skills to assert their interests in the digital space (Heath, 2018).

Digital Citizenship as Media and Information Literacy

Practical implementations of DCE efforts also often focus on fostering general media and information literacy, which are understood as lying at the core of DCE. These initiatives are situated within Choi's second category, Digital Citizenship as Media and Information Literacy (Choi, 2016, p. 13), which encompasses individuals' capabilities in accessing, utilizing, generating, and appraising information, as well as their abilities to engage in online communication. For instance, the digital media literacy framework by MediaSmarts and the curricula by Common Sense clearly prioritize digital competence (Ryland, 2018).

Early conceptualizations of citizenship in the digital age, such as that of Marchionini (1999), often emphasized information literacy, information seeking, and information science as being central to responsible citizenship. Similarly, Mossberger et al. (2008) emphasized the importance of information literacy, technical competence, and basic reading skills for effective digital participation. As digital technology continues to reshape many aspects of society, it is imperative for

[3] It must be noted that Ribble and Bailey (2007) adopts a broader perspective on DCE that extends beyond normative considerations to include issues around digital access and various dimensions of digital competence.

individuals to possess a fundamental technical understanding and proficiency to be able to engage in meaningful reflection on the deployment and consequences of digital technologies (Choi et al., 2017). Mossberger encapsulates the necessity of technical skills as a foundation for political participation:

> Digital citizens can be defined as those who use the internet every day, because frequent use requires some regular means of access (usually at home), some technical skill, and the educational competences to perform tasks such as finding and using information on the web, and communicating with others on the internet […] digital citizenship is an enabling factor for political citizenship… (Mossberger, 2008, p. 173–174).

The close relationship these ideas have with digital literacy, information literacy and media literacy raises the question of how to distinguish the concept of DCE from these domains. Terms like digital literacy, digital etiquette, digital well-being, and DC have often been used interchangeably in the literature, without adequate clarification (Chen et al., 2021). According to definitions by Cortesi et al. (2020), *digital literacy* entails effectively using information and communication technologies and serves as the foundation for navigating the digital landscape. *Media literacy*, on the other hand, emphasizes personal engagement with various media forms, including mass media and digital platforms, fostering skills like analysis, evaluation, and content creation. New ideas of media literacies expand upon this by integrating community involvement and participatory culture, acknowledging the evolving nature of digital communication. Moreover, Cortesi et al. (2020) suggest that *21st-century skills* focus on the broader competences individuals need to succeed in contemporary society and the workforce. While traditional skills like collaboration remain essential, 21st-century frameworks also emphasize adaptability and cross-cultural competences. *Digital competence* encompasses the ability to confidently and critically engage with information, society, and technology for various purposes, further enriching the other concepts by extending the scope of technical proficiencies to include the ethical considerations and cognitive skills necessary for navigating digital environments. It has evolved from early focuses on technical skills that encompass critical evaluation of online information (Cortesi et al., 2020).

However, the term “DCE” is sometimes used as little more than a label to imbue standard digital literacy efforts with additional significance (Ryland, 2018). When DC is conceived solely in terms of digital competence, it can align more with a set of skills that bears little relevance to the politicized status of a citizen.

This reductive interpretation of digital literacy has been criticized as adhering too closely to narrow, liberal ideas of citizenship that are limited to personal responsibility (Chen et al., 2021; Heath, 2018; Pangrazio & Sefton-Green, 2021).[4]

Digital Citizenship as Participation and Engagement

The perspectives of digital citizenship go beyond the assessment of behavior and internet usage skills to include the use of the internet for active political or social engagement. Choi (2016) described the *Digital Citizenship as Participation and Engagement* category as encompassing "various forms of online involvement, spanning political, socio-economic, and cultural participation" (p. 15). Bennett and Fessenden (2006) listed online activities such as writing letters "to political leaders, sharing personal or local insights on current issues, addressing civil rights, contributing to opinion polls, consulting an expert, or demonstrating support for a global or local environmental issue" (p. 144). However, participation can also involve other dimensions of online civic life such as gaming, popular culture, and individual self-expression (Choi, 2016).

This type of DCE targets something closer to Westheimer and Kahne's (2004) ideal of the participatory citizen. While their personally responsible citizen may also embody civic republican characteristics, the involvement of these individuals in public matters is typically confined to pre-existing structures within their community. In contrast, participatory citizens take a more proactive role in shaping these structures, operating within their society's established frameworks. Advocates for participatory citizenship contend that civic engagement goes beyond addressing specific problems or seizing opportunities within a community. More so than citizenship ideals based on personal responsibility, this type of ideal highlights the active development of relationships, trust, and commitments to a collective (Westheimer & Kahne, 2004, p. 242).

Recent European resources on DCE, such as the Council of *Europe's Digital Citizenship Education Handbook* (Richardson & Milovidov, 2022) and the European Commission's DigComp 2.2 – *The Digital Competence Framework for Citizens* (Vuorikari et al., 2022), have emphasized the interrelation between behavioral aspects, ethics, media literacy, information literacy, and political participation. The participatory dimension also becomes evident in the Council of Europe's definition of a digital citizen as "someone who, through the development of a broad range of competences, is able to actively, positively and responsibly engage in both on and offline communities, whether local, national or global" (Richardson & Milovidov, 2022, p. 11–12).

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[4] Regardless of the criticism, the two described areas of DCE play a significant role in shaping both theoretical and practical strategies in the field. Reviewing the frameworks, curricula, and guidelines mentioned in the introduction, it is evident that many fit into the two categories.

Digital Citizenship as Critical Resistance

A leaning toward either civic republican or liberal notions can be observed in instances where conceptualizations of citizenship are clearly articulated, as in the preceding examples, which placed a greater emphasis on engagement and participation (Choi, 2016). Civic republican perspectives emphasize participation in the political community and upholding individuals' civil, economic, political, and social rights. However, according to Heath (2018), the prevailing views of citizenship in DCE risk overshadowing alternative conceptualizations, such as W. L. Bennett's (2007) idea of actualized citizenship facilitated by digital media and new forms of social-justice–oriented forms of engagement through digital media. Such critiques echo sentiments previously voiced in the broader educational discourse on citizenship. Knight Abowitz and Harnish (2006) noted that liberal and civic-republican notions of citizenship remain dominant in schools and often leave no place for feminist, cultural, reconstructionist, queer, and transnational interpretations of citizenship.

Therefore, initiatives leaning toward either civic republican or liberal notions overlook the role of the citizen as a political agent and fail to address the question of how citizenship rights and obligations could be transformed through the internet and social media platforms, where the traditional influence of the nation-state is diminished (Chen et al., 2021) and the public sphere is undergoing drastic changes (Habermas, 2023). This highlights not only the limitations of conceptualizations of citizenship that focus exclusively on personally responsible, adapting, and/or individualistic citizens, but also of a narrow understanding of participation and engagement as confined to pre-given formats and structures. From the perspective of citizenship education, a focus on these conceptualizations may risk both sidelining the necessity for more creative forms of collective action and curtailing the imperative of autonomy for understanding society, societal norms, and opportunities for systemic transformation.

The pursuit of societal change and justice-oriented forms of engagement is reflected in conceptualizations of citizenship that draw from critical theory. Choi (2016, p. 17) consolidated these rare conceptual frameworks in the last category, *Digital Citizenship as Critical Resistance*. In frameworks that fall under this category, citizen action pertains to political and societal power dynamics. Individuals are expected to maintain analytical independence from social contexts, which enables them to recognize the interests articulated within society and the state and to expose existing institutions as intertwined with interests and structural conditions of inequality. Under this perspective, the responsibility of the citizen lies in advocating for social justice and de-hierarchization. Choi (2016) argued that the distinction between *Participation and Engagement and Critical Resistance* can sometimes be ambiguous, as both entail active, purposeful involvement in online communities. Following Choi, *Participation and Engagement* implies acceptable avenues for involvement within established systems, online events, or quick forms of activism like endorsing online petitions. In contrast, *Critical Resistance* seeks more inventive, unconventional, non-linear,

and non-hierarchical modes of participation, which may result in a deeper level of digital involvement (p. 17). Within this conceptualization of DC, Choi distinguished between, on the one hand, more reflective questioning and challenging of power structures and, on the other hand, activist involvement in plans to implement concrete societal changes using digital means. Movements such as #FridaysForFuture, #BlackLivesMatter, and the #MeToo feminist movement stand as notable exemplars illustrating how digital technologies and social networks can be leveraged to influence policymaking and shape public discourse.

Isin and Ruppert (2020) and McCosker et al. (2016) provided further examples of this critical perspective through their respective examinations of DC. They discussed both the liberating and empowering aspects of digital connectivity and participation as well as the oppressive control exerted by governments and technology giants through the implementation of codes on technology and datafication. Isin and Ruppert (2020) highlighted that individuals now assert their rights through online actions rather than relying on automatic inheritance within the traditional nation-state framework. According to them, this shift challenges established notions of citizenship and power dynamics, particularly in the context of online governance and regulation. McCosker et al. (2016) pointed to the regulatory mechanisms employed by governments and technology corporations to control digital spaces, highlighting the tensions between the liberating potential of digital connectivity and the oppressive surveillance and control exerted by powerful entities.

3 A More Comprehensive DCE Framework

Based on the theoretical foundation, we have developed an integrated framework that takes into account the diversity of civic ideals and the various dimensions of DC. Our motivation was to broaden the scope of existing frameworks to achieve a more comprehensive understanding of DC that reflects its dynamic and complex nature. Therefore, the purpose of the framework is not limited to a specific application or domain; rather, it serves as a comprehensive guide for the implementation and evaluation of digital civic education initiatives, nurturing critical thinking and advocating for justice in the digital realm.

To achieve this comprehensive perspective, existing frameworks have been synthesized into an integrated framework for DCE. This section first provides a brief overview of the frameworks utilized and a detailed explanation of the synthesis process. Throughout the framework synthesis process, we ensured that the dimensions of our framework were anchored in abilities rather than behaviors, beliefs, or attitudes because abilities are the primary targets of DCE interventions. Lastly, we explicitly align the dimensions of our integrated framework with the three citizenship types distinguished by Westheimer and Kahne (2004).

3.1 Four Frameworks as the Foundation for an Integrative DCE Framework

Our selection of four frameworks was based on an extensive review of the literature. The selection of the following four frameworks was based on their unique perspectives and strengths. Although each of these frameworks already encompasses multiple perspectives, they still have important differences. Synthesizing them on a meta-level enables us to combine their strengths and unique aspects, resulting in a broader and more comprehensive understanding. The four frameworks are described below.

1) The DigComp 2.2 framework by the European Commission (Vuorikari et al., 2022) is crucial for national frameworks, such as those developed by the Kultusministerkonferenz (KMK, 2017) in Germany and similar structures in Austria (see, e.g., fit4internet, 2023). Its reference framework comprises twenty-one subdimensions across five interrelated dimensions of digital competences essential in various educational contexts, encompassing aspects such as *information and data literacy or communication and collaboration* (see Table 1). Moreover, the reference framework is embedded within a comprehensive set of eight interrelated *Key Competences for Lifelong Learning*, encompassing aspects essential for personal fulfillment, healthy lifestyles, employability, active citizenship, and social inclusion.

2) The *Digital Citizenship Education Handbook* (hereafter referred to as the Handbook; Richardson & Milovidov, 2022) aligns with the Reference Framework of Competences for Democratic Culture (RFCDC; Council of Europe, 2016) and emphasizes the role of DC in fostering democratic principles, upholding human rights, and promoting active engagement in digital societies. By addressing themes such as *online safety, media literacy, and civic engagement* and viewing them as interrelated, the Handbook equips educators with tools to empower students in navigating the multifaceted landscape of the digital realm.

3) The Youth and Digital Citizenship+ framework, developed by Cortesi et al. (2020), contributes a scientifically grounded clarification and differentiation of the term “digital citizenship education.” Through an extensive analysis of various frameworks, Cortesi et al. critically examined DCE in relation to associated concepts like digital literacy and 21st-century skills. Their framework, featuring seventeen areas of life condensed into four dimensions (see Table 1), addresses competences essential for youth to engage fully in academic, social, ethical, political, and economic domains within the digital landscape. Its emphasis on *civic and political engagement* underscores the importance of active participation in public affairs and advocacy using both digital and non-digital tools to enhance community well-being. Additionally, the Youth and Digital Citizenship+

framework introduces the context area, which centers on understanding contextual factors of DC, including cultural, social, and global aspects, especially for underrepresented groups (Cortesi et al., 2020, p. 29). This fosters a critical perspective that goes beyond mere participation to question societal power relations.

4) Choi's (2016) concept analysis provides theoretically derived categories of DCE that complement the previous frameworks by emphasizing an explicit focus on a critical dimension. It allows for a deeper exploration of the societal and ethical implications of digital competences and their impact on individuals and society. Therefore, Choi's concept analysis plays a crucial role in further expansion of the critical perspective through the incorporation of more politically transformative aspects.

Table 1: Dimensions in the Frameworks of the Digital Citizenship Education Handbook, DigComp 2.2, Digital Citizenship+ (Plus), and Digital Citizenship for Democratic Citizenship Education in the Internet Age

Digital Citizenship Education Handbook	**DigComp 2.2**
Access and Inclusion	Information and Data Literacy
Learning and Creativity	Communication and Collaboration
Media and Information Literacy	Digital Content Creation
Ethics and Empathy	Safety
Health and Well-Being	Problem Solving
e-Presence and Communication	
Active Participation	
Rights and Responsibilities	
Privacy and Security	
Consumer Awareness	
Youth and Digital Citizenship+	**Choi (2016)**
Participation	Ethics
Engagement	Media and Information Literacy
Empowerment	Participation and Engagement
Well-being	Critical Resistance

3.2 Framework Synthesis

We began by integrating the five dimensions of the DigComp 2.2 framework with the ten dimensions delineated in the European Council's Handbook (Table 1). Despite their disparate foci, we observed considerable overlap between these frameworks. Notably, the DigComp 2.2 dimensions such as *information and data literacy, communication and collaboration, digital con-*

tent creation, and safety exhibited substantial correspondence with the Handbook dimensions media and information literacy, e-presence and communication, learning and creativity, and privacy and security, respectively. While this meant we could simply merge some of these dimensions, we made some minor adjustments where necessary. Firstly, we created a dimension we named Participation and Engagement from a combination of the active participation dimension of the Handbook, which pertains to the competences necessary for citizens to be fully aware when interacting within their digital environments to make responsible decisions, while actively and positively participating in democratic cultures, and the subdimension *engaging in citizenship through digital technologies*, derived from the communication and collaboration dimension of DigComp. Secondly, we incorporated an Ethics dimension into our integrated framework. It stemmed from a fusion of a part of the ethics and empathy dimension of the Handbook, which focuses on online ethical behavior and interaction with others and includes skills such as the ability to recognize and understand the feelings and perspectives of others, with the subdimension *protecting the environment* within DigComp's safety dimension.

To ensure the comprehensiveness of the framework, the next step involved cross-validation using Cortesi et al.'s (2020) Youth and Digital Citizenship+ as a reference. While many categories from Cortesi et al. were identified within the dimensions of our first synthesis framework, their organization often varied. Consequently, some dimensions were renamed and others were added. One significant modification to the current framework was the addition of two new dimensions. First, the sub-dimension *managing digital identity*, previously categorized under Communication and Collaboration, was elevated to its own dimension titled Identity and Self-Awareness Practices due to its relevance in Cortesi et al.'s framework. Specifically, it addressed *their identity exploration and formation dimension*, which reflects the ability to utilize (digital) tools to explore identity and understand how communities shape identity (p. 29). Secondly, the Critical Awareness dimension was added based on the context dimension in Cortesi et al.'s framework.

In the subsequent phase of development, Choi's (2016) framework was integrated into the synthesized framework. First, the Ethics dimension was amalgamated with the corresponding dimension in Choi's work. Subsequently, Choi's insights on *participation and engagement* were harmonized with Cortesi's discussions to clarify the distinction between *civic engagement,* which involves actions benefiting the community, and *political engagement*, which pertains to activities influencing governance and decision-making processes. Following that, the *critical awareness* dimension from Cortesi et al. was combined *with the critique of the existing power structure* sub-dimension from Choi's *critical resistance* dimension. This integration led to further differentiation into two distinct dimensions: Critical Awareness and Critical Action. While Critical Awareness emphasizes cognitive awareness and knowledge of contentious aspects of digitization, with a particular emphasis on agency in gathering

information on these issues, the new dimension, Critical Action shifts focus to the skills necessary for engaging in political transformation. This dimension is inspired by the second subdimension of Choi's *critical resistance* dimension, *political activism*, which Choi connects with recent transformative events such as the Arab Spring. In this context, Choi describes the internet as a tool to challenge inequality and catalyze societal change through grassroots movements and activist networks (Choi, 2016, p. 18).

The final framework included ten categories (Table 2). Each of the preliminary categories aligned with one of the citizenship types outlined by Westheimer and Kahne (2004). However, categorizing DC within rigid frameworks of citizenship types can run the risk of oversimplifying the complexities involved. For instance, critiquing power and authority digitally demands a degree of technical knowledge (Kenner & Lange, 2019). Similarly, fostering an understanding of DC as personal responsibility, which entails informed decision-making, can require an intricate knowledge of algorithms and their societal implications (Bloise & Hartmann, 2023; Heyen & Manzel, 2023). Nevertheless, we scrutinized the dimensions of our synthesis framework for possible alignment with citizenship types. This helped us to illuminate the prevailing citizenship ideals embedded within various DC concepts, laying the groundwork for a comprehensive framework that encapsulates all pertinent dimensions. Specifically, the categories Ethics, Safety Practices, Identity and Self-Awareness Practices, Data and Media Literacy, and Navigating Challenges may be best aligned with the personal responsibility type of citizenship. Content Creation, Communication and Collaboration, and Participation and Engagement corresponded best to the participatory ideal. The critical and transformative view of digital and political landscapes, which aligns with the justice-oriented citizen, was brought forth through the categories Critical Awareness of digital and social trends and Critical Action, which can be understood as engagement in digital-political transformation. One aspect that is only implicitly addressed in the current framework is artificial intelligence (AI). While DigComp 2.2 incorporates AI within its sub-dimensions and further differentiates it into knowledge, skills, and attitudes, Cortesi et al. (2020) include it as a separate dimension. In line with the DigComp framework and a recent publication by the Council of Europe (Holmes et al., 2022), we consider AI literacy to be a component of digital literacy and DC competence that can be situated in each of the ten dimensions.

Table 2: Integrated Framework of Abilities for Digital Citizenship (Infra-DC)

Addressed Citizenship-Type		Synthesized dimensions	Examples of Relevant Abilities
Westheimer & Kahne (2004)	**Choi (2016)**		
Personally Responsible Citizenship	Ethics	**1. Ethics** 1.1 Ethical use of technology 1.2 Responsibilities & rights 1.3 Environmental sustainability	● Ability to understand the ethical implications of technology usage, particularly concerning data collection and utilization ● Ability to understand and uphold digital rights (e.g., rights of privacy, security, access and inclusion, freedom of expression) while recognizing the responsibilities associated with digital citizenship (e.g., copyright, fair use) ● Ability to mitigate environmental degradation and promote sustainability in digital practices and technologies
	Media and Information Literacy	**2. Safety Practices** 2.1 Protection of devices 2.2 Privacy 2.3 Health and well-being 2.4 Consumer awareness	● Ability to ensure the security of electronic devices from cyber threats and unauthorized access ● Ability to safeguard individuals' personal information and privacy rights (e.g., digital footprint) ● Ability to navigate and cope with risky situations, thereby promoting physical and mental well-being ● Ability to understand the implications of the commercial reality of online spaces to maintain autonomy as a digital citizen
		3. Identity and Self-Awareness Practices 3.1 Self-awareness 3.2 Identity formation	● Ability to reflect on one's emotions, thoughts, and behaviors in the digital realm to enhance self-awareness ● Ability to utilize digital tools to explore and shape one's identity while understanding the influence of the online world
		4. Data and Media Literacy 4.1 Data navigation 4.2 Evaluation of digital content 4.3 Management of data	● Ability to navigate digital platforms to find and filter relevant information effectively ● Ability to assess the reliability, credibility, and relevance of data, digital information, and content ● Ability to organize and store digital data and content responsibly
		5. Navigating Challenges 5.1 Technical problems resolution 5.2 Recognition of societal needs 5.3 Reflection of competence gaps	● Ability to troubleshoot and resolve technical issues related to digital devices and systems ● Ability to recognize societal needs and identify appropriate technological solutions to address them ● Ability to identify and reflect on one's digital skills and knowledge gaps to inform continuous learning

Participatory Citizenship	Participation/ Engagement	**6. Content Creation** 6.1 Content creation 6.2 Adaption of digital content 6.3 Copyright and licenses	● Ability to create digital content across various platforms and formats ● Ability to combine and modify existing digital content to create new and innovative works ● Ability to understand and adhere to copyright laws and licensing agreements when creating and sharing digital content.
		7. Communication and Collaboration 7.1 Interaction 7.2 Sharing 7.3 Collaboration 7.4 Netiquette	● Ability to engage in interactions through digital technologies while upholding principles of respect, ethics, social responsibility, and empathy ● Ability to share information, resources, and ideas through digital channels to facilitate collaboration and knowledge exchange ● Ability to work together with others remotely using digital collaboration tools and technologies ● Ability to demonstrate appropriate digital etiquette and ethical, courteous behavior when interacting in digital environments
		8. Participation and Engagement 8.1 Civic engagement 8.2 Political engagement	● Ability to participate actively in public matters and advocate for causes that are important to oneself and the community ● Ability to engage in political processes using digital tools and platforms to influence governance and decision-making at various levels
Justice-Oriented Citizenship	Critical Resistance	**9. Critical Awareness**	● Ability to critically understand and reflect on political systems, governance structures, and societal dynamics and to recognize systemic injustices, discrimination, and oppression in political and social system
		10. Critical Action	● Ability to engage in activism and advocacy efforts to promote social and political change

4 Instruments for Standardized Evaluation

Apart from their conceptual differences, DCE efforts are also diverse in their methodologies, concrete objectives, concepts of citizenship, consideration of contextual factors such as distinct target demographics, and emphasis on particular technologies, social issues, cultural backgrounds, or aspects of technological access. Measurement instruments play a vital role in the evaluation of these various efforts by providing data on the abilities and expectations of target audiences, offering insights into the process dynamics of how courses or online resources are implemented, attended, used, and connected. They can also be employed when attempting to assess the outcomes and impacts of DCE efforts. In all these use cases, measurement tools can facilitate discussions on effectiveness, enabling organizers to ensure quality and share best practices.

As standardized tools, questionnaires provide a systematic and quantifiable method of evaluating the prevalence and emphasis of digital citizenship dimensions across diverse educational settings. By scrutinizing these measurement tools through the lens of our framework, we can conduct a broad, cross-sectional analysis of how digital citizenship is currently understood and implemented. Secondly, given that these tools are frequently used to inform the design and goals of educational interventions, focusing on questionnaires can help us address any identified gaps and thereby contribute to shaping the way the education system is evaluated and prompting more thorough adjustments in educational practices. Essentially, by ensuring that measurement tools are comprehensive and aligned with our integrated framework, we may indirectly contribute to the development of interventions that have the potential to become more holistic and effective over time.

In light of the diversity of the field, DCE-focused measurement tools must either be comprehensive enough to encompass the full range of skills involved in navigating the digital realm as a critical and reflective citizen or, alternatively, clearly indicate the specific type of DCE for which they are designed. For example, tools may be focused solely on certain aspects of digital literacy or only on the first citizenship type, personally responsible citizenship. Tools that solely target certain aspects without clearly indicating their intended scope within DCE may inadvertently contribute to the limited focus of DCE initiatives.

At the time of the writing of this article, a wide variety of measurement instruments are available. In an integrative review of DC across disciplines, Chen et al. (2021) identified a total of sixty-two instruments adopted in forty empirical papers that utilized quantitative or mixed methods. Based on a systematic review, Chen et al. argue that there is a need for a critical assessment of the field to track its evolution.

In examining a selection of widely cited and used measurement instruments for DCE in light of the Infra-DC, it became evident that they frequently exhibit a predominant focus on aspects that our framework categorizes as Safety Practices, Data and Media Literacy, and the more normative aspects of Communication and Collaboration (Fernández-Prados et al., 2021) – mirroring the limitations of DCE initiatives themselves. Accordingly, they tend to represent only the first of Westheimer and Kahne's (2004) citizenship ideals, the personally responsible citizenship type. For example, the questionnaires developed by Al-Zahrani (2015), Nordin (2016), Hui and Campbell (2018), and Jwaifell (2018) directly apply the often conduct-oriented categories from the models by Ribble (2004) or Ribble and Bailey (2007) and their later variants. These often center around concepts related to online respect and online safety, reflecting a focus on norm-abiding conduct and personal responsibility in online spaces. Jones and Mitchell (2016) extended this in their validated two-factor scale with the dimensions *Online Respect and Online Civic Engagement*. The latter dimension can be understood as an expression of our dimension Participation

and Engagement, thus reflecting a more participatory concept of citizenship. However, the items used in this scale mostly relate online civic engagement in the direct community environment of the respondents, which Westheimer and Kahne (2004) considered to be closer to the personally responsible type.

The relative absence of explicitly (digital) civic engagement in existing instruments was also noted by Chen et al. (2021), who coded quantitative instruments according to eight different schemes for the construct. They found that (digital) civic engagement was only measured in two out of the 60 studies they included and that both were published in political science journals. "It is not clear whether the lack of studies measuring DCE [i.e., digital civic engagement] was due to the lack of appropriate instruments, or that the lack of DCE instruments reported in the studies show a relatively low interest in this aspect of DC" (p. 10).

Chen et al. (2021) limited their review to instruments in papers published in peer-reviewed articles through 2020. There are two instruments not covered within this scope that place a greater emphasis on the Participation/Engagement dimension. The UNESCO policy for Digital Kids Asia-Pacific establishes digital citizenship as a multifaceted framework and includes both *Civic Engagement* – defined as the capacity to positively impact communities, both locally and globally, utilizing digital technology for the common good through community support – and *Political Engagement* (Shin et al., 2019, p. 78). Another example of a recent instrument explicitly addressing engagement comes from Peart et al. (2020). Their instrument focuses on digital and social skills as drivers of engagement and active involvement in political, cultural, and social spheres, thereby addressing the eighth dimension of our integrated framework. Furthermore, it emphasizes the importance of advancing societal changes towards social justice, equity, and human rights through educational initiatives and skill development (p. 3331). This perspective in large parts aligns with the Critical Action dimension.

However, a more explicit incorporation of the dimensions of Critical Awareness and Critical Action has, to our knowledge, only been undertaken by Choi et al. (2017). Their Digital Citizenship Scale (DCS), based on Choi's (2016) concept analysis, encompasses three extensively developed and inherently political dimensions: *local/global awareness, internet political activism, and critical perspective* (corresponding to our dimensions Participation and Engagement, Critical Awareness, and Critical Action), alongside two more digital literacy-oriented dimensions *networking agency* (similar to our dimension Communication and Collaboration) and *technical skills*. Despite these close correspondences, there are also some limits to the scope of this instrument. Choi et al.'s *technical skills* dimension, defined as "lower levels of media literacy and basic open source intelligence skills" (p. 111), does not explicitly include our dimensions of Ethics and Safety Practices. Also, our Identity and Self-Awareness Practices dimension, a crucial factor involving one's relation to others and so-

ciety, is not part of the DCS. The DCS can therefore be seen as lacking in regard to dimensions that are not inherently political. In summary, instruments focusing on various aspects of DCE capture distinct facets of the concept. All instruments are limited in scope, as they only address specific dimensions of DCE.

As underscored in our preceding discussion, significant disparities exist among conceptualizations of digital civic education and the underlying constructs of citizenship. These disparities are pertinent to the evaluation of programs in civic education, which may also pursue heterogeneous objectives. To enable equitable evaluation aligned with the objectives of individual programs, evaluation instruments should avoid implicitly privileging any one subset of goal concepts. Instead, they should ensure the possibility of realizing the diverse ideals of "good" citizenship that are prevalent in discourse and practice – irrespective of whether they derive from traditional paradigms emphasizing personal responsibility, participatory and common-good–oriented perspectives, or critical-transformative ideals. Our analysis has highlighted the focuses and limitations of existing evaluation tools. This insight is valuable not only for selecting the appropriate tool for different contexts but also for interpreting their results. We hope to see the development of more comprehensive instruments that capture the wide spectrum of DC skills.

5 Conclusions and Outlook

In this article, we embarked on a multifaceted exploration of DCE, aiming to delve deeper into its citizenship aspect. We initiated an investigation into its alignment with diverse ideals of citizenship and constructed a comprehensive framework integrating essential dimensions of citizenship-related skills. Subsequently, we assessed the representation of these dimensions in existing DCE measurement instruments.

The theoretical investigation of existing DCE frameworks from the perspective of citizenship ideals reveals – alongside other desiderata – that the critical perspective is rarely addressed and almost never thoroughly elaborated and described. Assessing the significance of the critical type of citizenship for democracy – particularly its fundamental importance for the emancipatory advancement of society and the governance system itself – underscores the need for recalibration in both frameworks and concrete DCE programs and efforts. Within our *Integrated Framework of Abilities for Digital Citizenship (Infra-DC)*, which comprises ten dimensions, we have integrated and differentiated this citizenship ideal.

The analysis of the representation of the dimensions of our integrated framework in existing DCE measurement instruments reveals a pattern similar to that shown by the examination of DCE frameworks and efforts. There is a predominant focus on concepts related to online respect and safety, with a clear emphasis on normative behavior and personal responsibility in online environments. While a few instruments incorporate elements of a critical perspective, it is important to note that all instruments are constrained in scope and focus on specific dimensions of DCE.

Our analysis underscores the imperative of systematically organizing existing instruments in accordance with our framework or developing new ones that fully encompass the diverse dimensions outlined within it. Such instruments should either embrace the multifaceted nature of citizenship education or refrain from implicitly favoring any specific approach without indicating it.

Moreover, we see a potential use for a similar theoretical framework in future research exploring teachers' beliefs about DCE within the school setting. The framework can offer a broader perspective on DCE learning in schools, enabling researchers to build upon the insights from studies like those conducted by Choi et al. (2018) and Vajen et al. (2023).

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