ORIGINAL ARTICLE

British Journal of
Educational Technology
⊞ BERA

How students can be effective citizens in the digital age: Establishing the Teachers' Perceptions on Digital Citizenship Scale

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Abstract

As teachers are purveyors of digital citizenship and their perspectives influence classroom practice, it is important to understand teachers' views on digital citizenship. This study establishes the Teachers' Perceptions of Digital Citizenship Scale (T-PODS) as a survey instrument for scholars to investigate educators' views on digital citizenship for their students. Drawing upon existing research, a theorized model of digital citizenship was developed and validated via a confirmatory factor analysis (CFA), resulting in a 14-item four-factor model. Factor constructs include digital ethics, participation and engagement, informed citizens and civic know-how. As teachers' views can shift over time, particularly with the emergence of new technologies, scholars can utilize T-PODS as they investigate educators' perceptions of digital citizenship across time and context.

KEYWORDS
digital citizenship, factor analysis, survey, teachers

INTRODUCTION

As new technologies emerge and the ways in which students collect and communicate information shift, digital citizenship is increasingly becoming an essential area for examination by school leaders, educators and teacher educators. Digital citizenship is broadly defined by the International Society for Technology in Education (ISTE, 2016) as the ability for students to 'recognize the rights, responsibilities, and opportunities of living, learning and working in an interconnected digital world, and… [who] act… in ways that are safe, legal, and ethical' (n.p.). In recent years, many states in the United States have adopted mandatory computer science standards, in recognition of the idea that students increasingly live and will work in

Practitioner notes

What is already known about this topic

- Digital citizenship is crucial for modern society and involves becoming a well-informed and responsible participant in digital spaces.
- A few instruments exist for measuring digital citizenship, which have focused on the behaviours and perceptions of young people, including children and university students.
- Teachers play an important role in helping children develop their digital citizenship skills.

What this paper adds

- This study presents a new validated model that conceptualizes four key constructs of digital citizenship: digital ethics, participation and engagement, informed citizen and civic know-how.
- It also demonstrates the relationship between these constructs and their connections to the literature.
- This article also establishes the Teachers' Perceptions of Digital Citizenship Scale (T-PODS), a 14-item survey instrument that measures teachers' perceptions of these four constructs.

Implications for practice and/or policy

- Researchers and educators can use T-PODS to understand teachers' perceptions of digital citizenship across time, locations and contexts.
- Drawing upon the four key constructs, teachers can identify and address constructs, skills and processes that are most applicable to their students and educational goals.
- Policymakers and curriculum developers can utilize these four constructs to develop both targeted and well-rounded digital citizenship educational experiences.

an interconnected digital world. Yet, not all states have developed required curricula or standards around digital citizenship to help students understand their rights and responsibilities in the digital world.

A report from the Education Commission of the States (2021) indicates that although most states have introduced policies concerning digital citizenship, only about 10 states have codified such policies. Because teachers, especially English Language Arts and Social Studies teachers who are generally responsible for teaching topics such as media literacy, are ultimately those who would teach digital citizenship skills to students, we believe it is important to understand how teachers perceive digital citizenship and what they believe students should know and be able to do. Accordingly, the purpose of this study is to introduce the Teachers' Perceptions of Digital Citizenship Scale (T-PODS). The T-PODS was designed in an attempt to develop a valid and reliable scale to understand teachers' beliefs about the value and importance of an array of digital citizenship skills, which we describe subsequently. Such a scale is necessary to give teachers a voice on the topic of digital citizenship so that they can potentially help inform future policies, curricula and standards on digital citizenship.

Defining digital citizenship

Scholars and organizations from multiple disciplines have defined or described digital citizenship as it relates to their disciplinary norms, discourses and practices. Before exploring perspectives on digital citizenship, however, we want to address the concept of digital literacy. Scholars have explored digital literacy in various ways, but perspectives largely centre around people's ability to locate, consume, create and communicate digital content through various digital technologies (Spires et al., 2018). These digital experiences are frequently multimodal in nature and include communicative modes such as written texts, audio, images and video (Rowsell, 2013). As demonstrated below, digital citizenship involves such processes, but it is conceptualized more specifically as it relates to responsibly participating in digital spaces as well-informed citizens who engage with civic issues. Thus, digital citizenship involves specific types of digital literacy skills that collectively help people behave ethically, understand social issues and participate in civic processes.

For the current study, we draw on several definitional and explanatory resources on digital citizenship relevant to educators. First, we turn to the digital citizenship strand of the ISTE Standards for Students. ISTE's standards are an important source of information since ISTE is the leading organization for guiding educators worldwide to '…use technology to transform teaching and learning, accelerate innovation, and solve tough problems in education' (ISTE, 2022, n.p.). ISTE's overarching digital citizenship standard is focused on safe, legal and ethical participation in digital spaces. The overarching standard is accompanied by four sub-standards focused on competencies around (a) managing digital identity; (b) positive, safe, legal and ethical digital behaviour; (c) rights and obligations of using and sharing intellectual property; and (d) managing personal data and maintaining digital privacy and security online. These standards primarily focus on the technical knowledge for safe, legal and ethical uses of digital technology.

By contrast, others emphasize the more critical and rhetorical aspects of digital citizenship and consider how concepts of digital citizenship should be '…conscious of political, social, economic, and cultural issues in society' (Choi, 2016). In alignment with this view, Choi (2016) conducted a concept analysis of the term digital citizenship and identified the following four categories as being central to the concept: (1) digital ethics, (2) media and information literacy, (3) participation/engagement and (4) critical resistance. Similar to ISTE's digital citizenship standard, Choi's digital ethics category refers to the use of safe, responsible and ethical online behaviours. However, Choi notes that digital citizenship also includes users' abilities to critically evaluate information, to participate in political, economic and social activities and to use digital technologies to challenge the status quo. The importance of the divergence between these two sources is that while ISTE's focus is mostly on technical know-how and ethics, the categories identified by Choi largely emphasize civic awareness and participation. Using the categories identified through the concept analysis, Choi et al. (2017) developed and published a valid, reliable Digital Citizenship Scale (DCS) for measuring individuals' digital citizenship across various domains. An exploratory factor analysis resulted in the DCS, a measure that can be used to evaluate the following five factors related to digital citizenship: (1) internet political activism, (2) technical skills, (3) local/global awareness, (4) critical perspective and (5) networking agency. Missing from Choi and colleagues' factors are items about online safety, responsibility and the ethical use and production of online information.

Based on our review of the ISTE Student Standards and Choi's and colleagues' DCS, in the current study, we attempted to develop a measure for evaluating teachers' perceptions of digital citizenship and what concepts and skills students should learn. To do so, we modified Choi's scale, which was designed to collect information about how college students participate as digital citizens. Our modifications included changing the wording of questions so that they focused on teachers' perceptions about the importance of digital citizenship skills and

behaviours rather than how students themselves engage in those behaviours. Additionally, we added items related to online safety, responsibility and the ethical use of online information, since those categories were missing from the DCS. In the next section, we discuss the importance of understanding teachers' perceptions about digital citizenship.

The importance of teacher perceptions

Teacher perceptions are commonly examined in educational research because of the extent to which teachers' perceptions are known to impact what and how they teach, regardless of other co-existing factors. For example, Hutchison and Reinking (2011) found that the more positive teachers' perceptions were about integrating digital technologies into their instruction, the more they overcame obstacles to integrate them. Relatedly, Abel et al. (2022) recently synthesized findings from 22 studies that focused on teacher perceptions of how digital technology is integrated into instruction. Their synthesis revealed many factors influencing teacher perceptions, and they describe many studies that indicated the impact of teacher perceptions on technology integration (eg, Gorder, 2008; Miranda & Russell, 2012; Ottenbreit-Leftwich et al., 2010). Given the importance of teacher perceptions of classroom practice, it is important to understand teachers' perceptions about digital citizenship.

Beyond the knowledge that teachers' perceptions shape their classroom practice, we contend that teacher voice is of utmost importance since teachers are deeply knowledgeable of classroom contexts and the realities of daily schooling. Furthermore, research has shown that providing teachers with opportunities to voice their ideas has been shown to lead to reductions in teacher attrition (García et al., 2022). Understanding teachers' perceptions about digital citizenship can also inform researchers about how teacher perceptions shift over time as new technologies emerge, new political situations unfold and new global events such as the COVID-19 pandemic occur. By staying conscious of these perceptions, we can continually inform standards and curricula on digital citizenship.

Purpose

Given the prominence of internet usage among school-aged youth and the increased use of digital media within school-based instruction, it is important for schools to implement digital citizenship programming. It is necessary to develop and assess contemporary measures for determining how teachers view critical aspects associated with digital citizenship programming. Therefore, this study was designed to assess the perceptions of digital citizenship among a large sample of English Language Arts and Social Studies teachers in the areas of *digital ethics, participation or engagement, informed citizenship and civic know-how*. The following research questions guided the study.

1. Does the theorized model proposed in this study maintain acceptable factor structure?
2. Do the researcher-created items on digital ethics cohere as an independent factor?

METHODS

Survey design

This study utilized a survey design methodology (Dillman, 2011), which is a 'nonexperimental research based on questionnaires or interviews' (Johnson & Christensen, 2019, p. 240),

to investigate the research questions outlined previously. To develop the survey used in the current study, we relied primarily on Choi et al.'s (2017) validated Digital Citizenship Scale (DCS). Choi et al. (2017) created the DCS by examining the literature for existing perspectives on and themes of digital citizenship. They identified four primary domains of digital citizenship in the literature: *Digital Ethics*, *Media and Information Literacy*, *Participation/Engagement* and *Critical Resistance*. *Digital Ethics* refers to people using digital technologies and the internet in safe and responsible ways. *Media and Information Literacy* centres around people's ability to use digital tools, including to access and evaluate information online. *Participation/Engagement* refers to people's 'political, economic, social, and cultural… activities', which can occur at local, national and international levels. *Critical Resistance* is similar to *Participation/Engagement*, yet it focuses on engaging in transformative behaviours that promote social justice and challenge the status quo.

Based on these four domains, Choi et al. (2017) created survey items that were reviewed by a panel of experts for content and clarity. This process led to the inclusion of 37 survey items that were distributed to 508 participants consisting of undergraduate- and graduate-level students at a large research university in the Midwest. Choi and colleagues then conducted an exploratory factor analysis (EFA) with half of the sample (n = 254) that resulted in a 26-item five-factor model of digital citizenship that included: Factor 1 – Internet Political Activism, Factor 2 – Technical Skills, Factor 3 – Local/Global Awareness, Factor 4 – Critical Perspective and Factor 5 – Networking Agency. Table 1 illustrates Choi et al.'s (2017) EFA factor loadings.

Following the EFA, Choi et al. (2017) conducted a confirmatory factor analysis (CFA) with the second half of the sample. The CFA was initially fit using the 26-item, five-factor model determined by the EFA. As noted by the researchers, the initial CFA did not maintain acceptable model fit. The modification indices were examined, and it was determined that there were a number of correlated residuals. To maintain the integrity of the initial EFA, residuals were allowed to be correlated, in a step-wise fashion, as long as they were associated with the same construct. In total, four pairs of correlated residuals were maintained in the final model, which resulted in acceptable model fit: $x^2 = 552.96$, $df = 285$, GFI = 0.86, CFI = 0.89, RMSEA = 0.06.

While the work of Choi et al. (2017) resulted in the validated DCS, we made two primary modifications to the scale. First, the DCS was designed for users to reflect on their own behaviours and perspectives, and thus, the items began with phrases such as 'I can', 'I think', and 'I am'. This is an important and reasonable approach for the purpose of understanding people's perspectives (in this case, university students) on their own digital citizenship. However, it is also important to understand educators' perspectives on digital citizenship and what they think their students should know and be able to do regarding digital citizenship. This modification was particularly important because educators are often the primary purveyors of digital citizenship education and their perspectives likely influence what digital citizenship content, ideas and skills are taught. Thus, we altered and framed items from the DCS to understand the teachers' perspectives. For example, the original DCS item of 'I work with others online to solve local, national, or global issues' was modified to 'It is valuable for students to know how to work with others online to solve local, national, or global issues'.

The second primary modification we made to the DCS aligned with our effort to create an updated scale that better encapsulates perspectives on digital citizenship in the literature. Specifically, we added survey items on safe, responsible and respectful behaviour in digital spaces. These are important and long-standing concepts in the digital citizenship literature (Hollandsworth et al., 2011; Ohler, 2011; Ribble et al., 2004; Ribble & Park, 2022). Safety, responsibility and respect are also represented in the ISTE's Digital Citizen Standards for Students, which include standards such as Standard 1.2.b: 'Students engage in positive, safe, legal, and ethical behavior when using technology, including social interactions online

TABLE 1 Choi et al.'s (2017) Digital Citizenship Scale Items and factor loadings.

Items	F1	F2	F3	F4	F5
Factor 1: Internet political activism					
25. I attend political meetings or public forums on local, town or school affairs via online methods	0.75				
28. I work with others online to solve local, national or global issues	0.68				
30. I organize petitions about social, cultural, political or economic issues online	0.65				
17. I regularly post thoughts related to political or social issues online	0.60				
24. I sometimes contact government officials about an issue that is important to me via online methods	0.58				
19. I express my opinions online to challenge dominant perspectives or the status quo with regard to political or social issues	0.56				
29. I sign petitions about social, cultural, political or economic issues online	0.55				
26. I work or volunteer for a political party or candidate via online methods	0.46				
23. I belong to online groups that are involved in political or social issues	0.45				
Factor 2: Technical skills					
9. I can use the Internet to find information I need		0.92			
10. I can use the Internet to find and download applications (apps) that are useful to me		0.78			
8. I am able to use digital technologies (eg, mobile/smart phones, Tablet PCs, Laptops, PCs) to achieve the goals I pursue		0.72			
7. I can access the Internet through digital technologies (eg, mobile/smart phones, Tablet PCs, Laptops, PCs) whenever I want		0.60			
Factor 3: Local/global awareness					
13. I am more informed with regard to political or social issues through using the Internet			0.89		
14. I am more aware of global issues through using the Internet			0.83		
Factor 4: Critical perspective					
34. I think online participation is an effective way to make a change to something I believe to be unfair or unjust				−0.68	
36. I think I am given to rethink my beliefs regarding a particular issue/topic when I use the Internet				−0.68	
22. I think online participation is an effective way to engage with political or social issues				−0.55	
32. I think online participation promotes offline engagement				−0.54	
37. I think the Internet reflects the biases and dominance present in offline power structures				−0.52	
31. I am more socially or politically engaged when I am online than offline				−0.50	
35. I use the Internet in order to participate in social movement/ change or protest				−0.47	

T A B L E 1 (Continued)

Items	F1	F2	F3	F4	F5
Factor 5: Networking agency					
16. Where possible, I comment on other people's writings in news websites, blogs or SNSs I visit					0.64
11. I enjoy communicating with others online					0.50
12. I enjoy collaborating with others online more than I do offline					0.47
15. I post original messages, audio, pictures or videos to express my feelings/thoughts/ideas/opinions on the Internet					0.44

T A B L E 2 Researcher-created survey items.

Question number	New digital ethics survey questions
Q36	It is valuable for students to know how to keep themselves safe in online environments
Q37	It is valuable for students to know that messages and media they create online are often permanent
Q38	It is valuable for students to know and obey laws related to digital copyrights and piracy
Q39	It is valuable for students to treat other people with respect in online environments
Q40	It is important that students do not bully other people on the internet
	New 'Students Should' Survey Questions
Q26	Students should actively contribute to online communities
Q27	Students should actively participate in online spaces related to social and political issues
Q28	Students should critically evaluate media messages they encounter on the internet

or when using networked devices' and Standard 1.2.c: 'Students demonstrate an understanding of and respect for the rights and obligations of using and sharing intellectual property' (ISTE, 2016, n.p.). While questions on digital ethics were present in the original pool of survey items of Choi et al. (2017), those items did not load onto their model and thus were not included in their DCS instrument. Thus, the present study addresses this issue by creating and including five new survey items focused on the issues of safety, responsibility and respect (see Table 2 for researcher-created survey items).

We also added three items phrased as 'Students should…', as we believed that teachers may feel differently about students knowing how to engage in a type of digital citizenship behaviour (eg, online political participation) in comparison to whether they think students should engage in such behaviours. Finally, we deleted eight items from the DCS that were redundant to other items (such as including one item on online petitions instead of two items). We also deleted items that no longer aligned with the shift from a perspective about oneself to a teacher's perspective about a student (eg, 'I enjoy collaborating with others online').

Our modifications of the DCS resulted in a final survey that included 25 five-point Likert-scale items, including 17 modified items from the DCS and 8 researcher-created items. The 17 modified items from the original DCS shifted item phrasing to focus on what students should know and be able to do. Five additional demographic items followed, which included

age, gender, grade level taught, years of teaching experience and district setting (rural, suburban or urban).

Theorized factor structure

As we modified Choi et al.'s (2017) DCS and added eight new items to the survey, we theorized that a new factor structure would emerge from survey data that would be grouped along the following constructs: *digital ethics*, *participation/engagement*, *informed citizen*, and *civic know-how*. We predicted that a CFA would lead to a *digital ethics* factor, given that digital ethics is a prominent theme in existing digital citizenship literature (eg, Choi et al., 2017; ISTE, 2016; Ribble, 2015). The constituent items of digital ethics deal with safety, respect and responsibility, which are often examined together in digital citizenship literature, and thus justifying our prediction of a factor construct of digital ethics.

We also predicted that the CFA would lead to *participation/engagement* being identified as another factor, given the prominence of this theme in the literature and the presence of participation/engagement items in the original DCS survey (Choi et al., 2017). We believed that many of the items from Choi and colleagues' factor of internet political activism would load onto this participation/engagement factor of our new survey.

Informed citizen was another factor we predicted would emerge from a CFA. This construct aligns with existing scholarship, hence the media and information literacy theme of digital citizenship literature identified by Choi and colleagues. This construct emphasizes the importance of people's ability to locate and critically evaluate media messages to make them more capable digital citizens (Hobbs, 2010). We anticipated that the items from Choi and colleagues' local/global awareness factor would load onto this factor, as would items from other DCS items related to critical thinking.

Our final predicted factor was *civic know-how*. As we modified survey items for the new target audience (ie, teachers), as noted previously, we adjusted the wording from items like 'I express my opinions…' to 'It is valuable for students to know how to express their opinions…'. We made this modification for two reasons. The first was to frame survey items from the teachers' perspectives. The second was because we hypothesized that teachers would be more interested in students knowing how to participate in civic spheres rather than wanting or expecting students to participate in online civic processes. We believed that this 'know-how' to participate in civic engagement items would load together and would largely draw its items from Choi et al.'s factor of internet political activism.

Participants and data collection

The participants in this survey were middle- and high-school (fifth through twelfth grades) English language arts and social studies teachers in a Midwestern state in the United States. This population was selected given the relevance of digital citizenship in these subject areas. The state's Department of Education provided the researchers with the email addresses of the English language arts and social studies teachers in the state. The researchers sent the survey to potential participants via email through Qualtrics. Potential participants received multiple requests for participation throughout the course of a month to increase the participation rate and completeness of responses. Any participant who did not have a 100% completion rate for their survey was deleted from the dataset prior to analysis. Therefore, the dataset used for the current study did not have any missing data. See participant demographics in Table 3.

TABLE 3   Summary of participant demographics.

Subject area taught	
English language arts	74.1%
Social studies	25.9%
Years of teaching experience	
0–4	18.6%
5–9	18.4%
10–14	18.0%
15–20	18.8%
More than 20	26.2%
Age	
20–29	22.2%
30–39	30.6%
40–49	27.3%
50–59	16.3%
60 or older	3.6%
School district setting	
Rural	45.6%
Suburban	42.7%
Urban	11.7%
Gender	
Female	74.8%
Male	23.1%
Non-binary/third gender	0.3%
Prefer not to say	1.7%

Analytic plan

Given that psychometrics and a factor structure previously existed from Choi et al.'s (2017) study, and our immediate interest in establishing a measure that was streamlined and representative of the four outlined constructs of digital citizenship, we tested the previously outlined four-factor structure through a confirmatory factor analysis (CFA). Since it was our *a priori* decision to evaluate the four-factor structure with an emphasis on streamlining the measure, while maintaining the integrity of a CFA, we deviated from Choi and colleagues' approach in relation to item deletion. Specifically, once the initial model was fit, we employed a step-wise deletion process that promoted reliability via systematically removing items in the following order: (1) items were removed if they did not maintain a significant factor loading on the theorized construct, (2) items were removed if they significantly cross loaded on a separate construct and (3) items were removed if there was considerable correlation with the error terms. However, we maintained Choi et al.'s (2017) approach, according to which model trimming ceased when the model was within range of acceptable model fit.

To evaluate the CFA, we used Mplus version 8 (Muthén & Muthén, 2017) which is an analytic program for conducting complex analyses, including CFA and structural equation models. As previously stated, we used a step-wise deletion process to trim the model until acceptable model fit was achieved. We maintained a conventional approach to evaluating model fit, including examining various model fit statistics to determine if the theoretical model was tenable. These model fit statistics included examining x^2, the root mean square

error of approximation (RMSEA), RMSEA 90% confidence interval, Tucker–Lewis Index (TLI) and comparative fit index (CFI), all of which are commonly accepted in the evaluation of a CFA (see Cheung & Rensvold, 2002). Acceptable model fit was grounded in conventional thresholds. Specifically, $X^2/df < 3$ (Kline, 1998), RMSEA < 0.05 (Hu & Bentler, 1999) and TLI and CFI > 0.95 (Schermelleh-Engel et al., 2003) represent a close-fitting model. It should also be noted that as a default function in MPlus (Muthén & Muthén, 2017), the lead item's loading per construct, was fixed to 1.00 to set the scale (see λ for loading estimates in Table 5). However, per general CFA convention, standardized estimates are provided in Figure 1 (see λ^a in Table 5).

RESULTS

The theoretical, four-factor model with 25 items was initially evaluated, which resulted in poor-to-mediocre model fit. Specifically, the $X^2/df = 31.62$, which exceeded the threshold of 3. However, it should be noted that X^2 is sensitive to sample size (Cheung & Rensvold, 2002), so additional fit statistics were examined. Analysis revealed that the RMSEA (0.082), TLI (0.81), and CFI (0.83) all exceeded the expected threshold for acceptable model fit (see Table 4 for fit statistics). Therefore, the step-wise deletion process was employed, as outlined above in the analytic plan, which resulted in the deletion of 11 items, including 1 from *Digital Ethics*, 4 from *Participation and Engagement*, 2 from *Informed Citizen* and 4 from *Civic Know-How*. Once these items were removed, no non-significant paths, dual loadings or correlated residuals remained in the final model, which included 14 items (ie, 4 in *Digital Ethics*, 3 in *Participation and Engagement*, 3 in *Informed Citizen* and 4 in *Civic Know-How*;
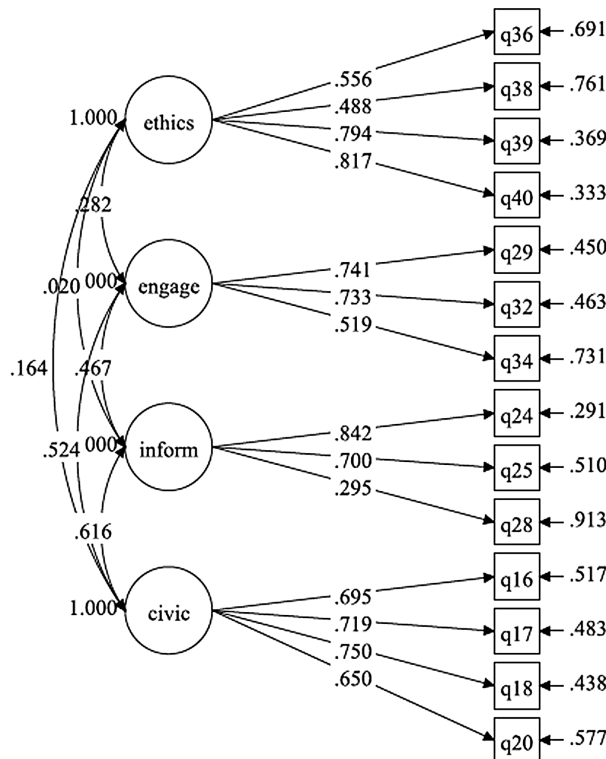

FIGURE 1 CFA model of Teachers' Perceptions of Digital Citizenship Scale (T-PODS).

TABLE 4 Fit indices for measurement model.

Model	X^2	df	p	RMSEA	RMSEA 90% CI	TLI	CFI
Theoretical model	9487.16	300	<0.001	0.082	0.078–0.085	0.81	0.83
Final model	193.66	71	<0.001	0.045	0.037–0.052	0.95	0.96

see Table 5 for specific items). The final model resulted in a close fit on all fit statistics including $X^2/df = 2.73$, RMSEA = 0.045, TLI = 0.95 and CFI = 0.96. Given the close fit of the model, the 11 items retained statistically represent the four-factor model of *Digital Ethics, Participation and Engagement, Informed Citizen* and *Civic Know-How*. Figure 1 and Table 5 include the item to construct loadings for the final model, and retained item associations and construct internal consistency are evaluated and presented in Table 6.

DISCUSSION

Given the importance of digital citizenship in the modern age (ISTE, 2016; Ribble, 2015), it is crucial to understand teachers' perspectives on digital citizenship, as educators' perspectives on topics and technology influence if and how they teach related material and skills in their classrooms (Miranda & Russell, 2012; Ottenbreit-Leftwich et al., 2010). The results of this study suggest that the T-PODS is a reliable and valid measure for measuring teachers' perspectives on their students' digital citizenship. This study's CFA produced and validated our theorized four-factor model on digital ethics, participation and engagement, informed citizen and civic know-how.

Connections and contributions to literature

The findings of this study relate to existing scholarship in a few important ways. First, the emergence of digital ethics as a cohesive factor aligns with research that indicates the importance of ethical behaviour as a crucial aspect of digital citizenship, which highlights the importance of safe, respectful and responsible behaviours in online environments (Choi et al., 2017; ISTE, 2016; Jones & Mitchell, 2016; Ribble, 2015). Furthermore, Choi et al.'s DCS did not include a digital ethics factor or items, and thus, this study contributes to the literature by establishing a survey instrument that includes digital ethics as a key component of digital citizenship. Ethical behaviour in online environments is crucial, particularly given the prominence of illegal activities (eg, piracy) and antisocial behaviour (eg, harassment and cyberbullying) in online spaces (Belleflamme & Peitz, 2012; Zhu et al., 2021). This instrument will enable future researchers to examine teachers' perspectives on digital ethics and related subcategories, such as engaging in safe, respectful and legal behaviours in digital environments.

The participation and engagement factor connects to themes of digital citizenship scholarship (Gleason & von Gillern, 2018). Choi et al. (2017), for example, reviewed the digital citizenship research and identified participation/engagement as a central theme in the literature. Two of the items in this factor (Q29 and Q32) were drawn from the DCS and originally loaded on Choi and colleagues' critical perspective factor, which illustrates the importance of civic engagement and challenging dominant power structures to improve one's community. This result aligns with the literature and recognizes that digital citizenship often involves using critical perspectives when participating in digital spaces (Emejulu & McGregor, 2019; Garcia et al., 2021).

TABLE 5 Items, loadings, intercepts, estimated latent variance, mean scores, unique residuals and squared multiple correlations for measurement model.

Scale	λ	τ	λ^{a}	M	Θ	R^2
Digital ethics						
Q36. It is valuable for students to know how to keep themselves safe in online environments	1.00 (0.00)	4.92 (0.01)	0.56	4.92	0.06 (0.00)	0.31
Q38. It is valuable for students to know and obey laws related to digital copyrights and piracy	1.73 (0.15)	4.70 (0.02)	0.49	4.70	0.25 (0.01)	0.24
Q39. It is valuable for students to treat other people with respect in online environments	2.01 (0.14)	4.86 (0.01)	0.79	4.86	0.06 (0.01)	0.63
Q40. It is important that students do not bully other people on the internet	1.71 (0.11)	4.92 (0.01)	0.82	4.92	0.04 (0.00)	0.67
Participation & engagement						
Q29. I think online participation is an effective way for students to make a change to something they believe to be unfair or unjust	1.00 (0.00)	3.54 (0.03)	0.74	3.54	0.37 (0.03)	0.55
Q32. I think online student participation related to social issues promotes offline student engagement with such issues	1.01 (0.07)	3.55 (0.03)	0.73	3.55	0.40 (0.03)	0.54
Q34. It is valuable for students to know how to comment on other people's writings on news websites, blogs or social networking sites they visit	0.71 (0.06)	3.84 (0.03)	0.52	3.84	0.62 (0.03)	0.27
Informed citizen						
Q24. Students should become more informed with regard to local and state level political or social issues through using the Internet	1.00 (0.00)	3.91 (0.03)	0.84	3.91	0.17 (0.03)	0.71
Q25. Students should become more aware of global issues through using the Internet	0.75 (0.05)	4.16 (0.02)	0.70	4.16	0.24 (0.02)	0.49
Q28. Students should critically evaluate media messages they encounter on the internet	0.27 (0.04)	4.63 (0.02)	0.30	4.63	0.31 (0.02)	0.09
Civic know-how						
Q16. It is valuable for students to know how to use the internet to attend political meetings or public forums on local, town or school affairs	1.00 (0.00)	3.76 (0.03)	0.70	3.76	0.38 (0.02)	0.48
Q17. It is valuable for students to know how to work with others online to solve local, national or global issues	0.93 (0.05)	4.18 (0.03)	0.72	4.18	0.28 (0.02)	0.52
Q18. It is valuable for students to know how to use social media to organize petitions about social, cultural, political or economic issues online	1.06 (0.06)	3.71 (0.03)	0.75	3.71	0.31 (0.02)	0.56
Q20. It is valuable for students to know how to use online methods to contact government officials about an issue that is important to them	0.77 (0.05)	4.28 (0.02)	0.65	4.28	0.29 (0.02)	0.42

Note: λ = Loading Estimates (SE); τ = Intercept Estimates (SE); λ^{a} = Standardized Loadings—STDYX; Θ = Residual (SE).

TABLE 6 Correlations between retained items and construct Cronbach's α for final model.

	Q16	Q17	Q18	Q20	Q24	Q25	Q28	Q29	Q32	Q34	Q36	Q38	Q39
Q17	0.55**												
Q18	0.50**	0.52**											
Q20	0.46**	0.47**	0.49**										
Q24	0.36**	0.34**	0.44**	0.36**									
Q25	0.22**	0.27**	0.33**	0.29**	0.59**								
Q28	0.15**	0.17**	0.13**	0.23**	0.22**	0.25**							
Q29	0.23**	0.28**	0.38**	0.21**	0.27**	0.26**	0.12**						
Q32	0.23**	0.24**	0.32**	0.17**	0.29**	0.29**	0.09**	0.55**					
Q34	0.22**	0.25**	0.27**	0.16**	0.18**	0.16**	0.05	0.37**	0.37**				
Q36	0.04	0.11**	0.05	0.08*	−0.01	0.04	0.19**	0.05	0.08*	0.08*			
Q38	0.08*	0.09**	0.08*	0.12**	−0.04	0.01	0.08*	0.11**	0.11**	0.18**	0.32**		
Q39	0.06	0.13**	0.12**	0.11**	0.00	0.07*	0.08*	0.16**	0.18**	0.19**	0.43**	0.38**	
Q40	0.05	0.10**	0.09*	0.06	−0.03	0.05	0.08*	0.15**	0.15**	0.15**	0.46**	0.39**	0.65**
Cronbach's α	Digital Ethics=0.72			Participation & Engagement=0.70			Informed Citizen=0.63			Civic Know-How=0.80			

*<0.05. **<0.001.

The informed citizen factor on the T-PODS drew two of its items from the local/global awareness factor on the DCS (Choi et al., 2017) and also included a new survey item (Q28— students should critically evaluate media messages they encounter on the internet). This new factor, thus, subsumes the only two items from the local/global awareness factor from the DCS and also includes a new item on the importance of critically evaluating media messages. Collectively, the informed citizen factor aligns with scholarly perspectives on recognizing how media literacy is an important component of digital citizenship (Erdem et al., 2023). This perspective emphasizes how media literacy skills, including accessing and critically analysing media messages, help people become informed citizens capable of learning about global affairs (Hobbs, 2010; von Gillern et al., 2022, 2024).

Civic know-how emerged from analysis as a factor focused on student's understanding of how to use online tools to participate in political and social processes. Notably, all of the items that loaded in this factor focus on knowing how to participate in civic processes rather than actually participating. This is an important distinction. These items all coalesce around a single factor, suggesting that teachers want students to understand *how* to participate in political and social processes, but do not necessarily think that students need to or should participate in such processes. The decision to participate, perhaps, is best left to the student/individual. Nonetheless, teachers recognize the importance of knowing how to participate in civic processes, including how to attend political meetings, work with others online to solve social issues, organize petitions and contact government officials. These processes align with Mossberger et al.'s (2007) perspective on digital citizenship, which posits that online engagement is essential to full access and participation in modern democratic societies. Similarly, Jones and Mitchell (2016) stress the importance of civic engagement as a crucial feature of digital citizenship, and civic know-how is a precursor to such engagement.

Establishing the T-PODS survey is a valuable contribution to the literature because it can be used by researchers and educational organizations in their efforts to understand teachers' perceptions of digital citizenship. Understanding educators' perspectives on technologies and appropriate uses of technology is important because of how they influence their teaching practices (Miranda & Russell, 2012; Ottenbreit-Leftwich et al., 2010). Furthermore, given the regular emergence of new technologies, researchers can utilize T-PODS in different contexts and points in time to identify patterns on how teachers' perspectives on digital citizenship may differ and evolve in response to new technological developments. For example, the rapid proliferation of generative artificial intelligence and large language models (Barrat, 2023; Holmes et al., 2023) will influence the digital citizenship landscape and need scholarly investigation (von Gillern et al., 2024). Teachers of different grade levels, content areas and locations may have varying perspectives on digital citizenship and whether/how they help students develop related knowledge and skills as the technological landscape evolves. Investigating these issues may illuminate gaps and opportunities for educators to prepare their students to be ethical and informed digital citizens. Such research may be coupled with investigations of if and how current curricula address digital citizenship and if aspects of digital citizenship valued by surveyed teachers are included in their instruction and effectively promote student learning.

Limitations

A primary limitation of this study is that the data utilized to establish the instrument was exclusively collected from English language arts and social studies teachers in a single Midwestern state. Thus, the data and findings may not be representative of the perspectives of teachers from different locations around the United States or the world more broadly. Similarly, this study only surveyed secondary teachers, and the perspectives of elementary

and tertiary educators may be different. For example, elementary teachers are likely less interested in their students engaging in political participation in digital spaces than secondary- or university-level educators. Additionally, the T-PODS instrument was designed to quantitatively measure educators' perspectives on digital citizenship. However, conducting interviews and focus groups with teachers may result in additional and unique insights about their perceptions on digital citizenship and its relevance for the classroom. Thus, future research that utilizes T-PODS in conjunction with qualitative data collection would be valuable.

CONCLUSION

The T-PODS examines educators' perspectives on students and digital citizenship and can be used by researchers and educational organizations to understand how teachers value different aspects of digital citizenship. The four-factor model illustrates that digital ethics, participation and engagement, informed citizen and civic know-how are core aspects of digital citizenship. These factors empower students to participate in online communities and civic spheres as safe, responsible and well-informed citizens capable of participating in and advocating for social change. Teenagers in the United States often spend more than 8 hours a day on entertainment screen time, which is in addition to screen time for their schooling (Common Sense Media, 2022). It is thus crucial that researchers and educators understand digital citizenship and specific skills for students to develop. The T-PODS can contribute to this goal by illuminating teachers' perceptions, which can then be addressed through teacher education and professional development. These are important endeavours that can help prepare educators to teach critical digital citizenship skills that help students flourish safely in online environments and work to understand their community and make it a better place.

CONFLICT OF INTEREST STATEMENT
The authors report no conflict of interest.

DATA AVAILABILITY STATEMENT
The authors are willing to share study data upon reasonable request.

ETHICS STATEMENT
Institutional Review Board approval was received for this research.

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How to cite this article: von Gillern, S., Rose, C., & Hutchison, A. (2024). How students can be effective citizens in the digital age: Establishing the Teachers' Perceptions on Digital Citizenship Scale. *British Journal of Educational Technology*, *00*, 1–17. https://doi.org/10.1111/bjet.13434