Instruments for measuring Digital Citizenship Competence in schools: a scoping review

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Abstract

The integration of digital technology into the teaching and learning process has both good and negative consequences. Several schools have incorporated digital citizenship to teach the responsible use of technology. The purpose of this scoping review is to provide an overview of research on tools for measuring digital citizenship competency among school children. This scoping study focuses on three main areas: (a) defining digital citizenship and competency; (b) instrument development and characteristics; and (c) key findings. The main outcomes of this research may help students, teachers, and school administrators implement digital citizenship education programs in schools.

KEYWORDS: Digital Citizenship; Measuring Instrument, School Students, Education Programs, Digital Technology.

1. Introduction

The word "citizenship" comprises rights and duties based on geographic, cultural, and political limits (Mulyono et al., 2021). The term "citizenship" has obvious geographical bounds. The old definition of citizenship is criticised for neglecting current diversity and globalisation trends. According to Choi (2016), real citizenship is more closely linked to identity and community. Traditionally, Marshall (1950) defined citizenship as a status granted to complete community members. The term "community" is crucial in discussing citizenship, since it stems from people' natural desire to unite and serve others.

The internet may improve society by facilitating membership and involvement, known as social inclusion (Mossberger et al., 2008) . Online group formation with sufficient emphasis and cohesiveness leads to citizenship difficulties (Ohler, 2011); Mossberger et al.

(2008) defines it as a digital community. This method connects "citizenship" and "digital" to each other. The blend of offline and online interaction creates a daily emotional, behavioral, and experiential encounter in the virtual world (Mulyono et al., 2021). Digital citizenship cannot be divorced from the broader notion of citizenship. Choi (2016) defines digital citizenship as including social duty, informed awareness, and active involvement. The issue of digital citizenship is interdisciplinary and complex. Some sources define digital citizenship as a foundation for digital literacy that emphasises (1) online behaviour respect and (2) citizen involvement (Jones & Mitchell, 2016). Digital citizenship, a prevalent idea in education, refers to responsible technology usage (Ribble & Bailey, 2004b; 2007).

The fast progress of technology has had a huge influence on education, especially since the COVID-19 Pandemic. This transition has boosted chances for learning and cooperation in school education while also introducing new problems and concerns.

One of the most pressing challenges is the growth of cyberbullying, which has grown increasingly common as a result of greater internet connection. Cyber etiquette, privacy, and protection have become more important as students traverse digital places where personal information may be subject to misuse.

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Table 1- Digital citizenship frameworks from various research studies.

Author/ Institution	Factors/Dimension	Target group
Ribble, 2009	1. Digital Access 2. Digital Commerce 3. Digital Communication 4. Digital Literacy 5. Digital Etiquette 6. Digital Law 7. Digital Rights and Responsibilities 8. Digital Health and Wellness 9. Digital Security	Teachers and students
ISTE 2019	1. Inclusive 2. Informed 3. Engaged 4. Balanced 5. Alert	Teachers and students of all grades
iKeepsafe	1. Use of digital balance 2. Ethical digital use 3. Protection of personal information 4. Maintaining healthy and safe relationships 5. Building a positive reputation 6. Achieving digital security	School students
Choi, Glassman, & Cristol, 2017	1. Self-identity 2. online activity 3. Fluence in digital environment 4. Ethics of digital environment	College students and adults
Jones & Mitchell, 2016	1. Online respect 2. Online civic engagement	Adults and students above 11
Common sense and media, 2019	1. Media balance and well-being 2. Privacy and security 3. Digital footprint and identity 4. Relationships and communication 5. Cyberbullying, digital drama and hate speech 6. News and media literacy	Students of all ages
Lindsey, 2015	1. Copyright 2. Digital footprints / social media 3. Acceptable use policies 4. Promoting responsible student behavior	Teachers and students
Payne, 2016	1. Internet Ethics 2. Information Security 3. Cyber Security	Teachers

The digital literacy gap, sometimes known as the digital divide, has grown as schools increasingly depend on technology for instruction. Students from marginalized families may not have access to required technology or internet connection, aggravating educational inequities. Bridging the gap and providing fair access to technology has become a top priority for educators and governments.

Digital citizenship education has grown in popularity because it provides students with the information, skills, and attitudes required to navigate the digital world responsibly and ethically. It covers issues such as online safety, responsible internet usage, critical thinking in digital settings, and respect for others' digital rights. Incorporating digital citizenship education into the curriculum helps students become responsible digital citizens. Educators play an important role in passing on these lessons, developing critical thinking skills, encouraging empathy and respect in online interactions, and discussing the ethical implications of technology usage. Collaboration between schools, parents, and communities is critical for reinforcing these skills and providing consistent assistance in navigating the digital world. Schools throughout the world are implementing "Digital Citizenship Education" to help students improve their online skills, creativity, and legal awareness. Digital citizenship education aims to educate students how to work, live, and contribute constructively in digital environments (Pandian et al., 2023).

Students, teachers, school administrators, and parents have a limited understanding of the various strategies that schools can implement to promote digital citizenship education. The aim of this scoping review is to provide a comprehensive overview of research on the framework and instrument used to measure digital citizenship competency among school students. This study focuses on three main areas: the definition of digital citizenship and its competence; the characteristics of the instruments used to measure digital citizenship in schools; and key findings. In short, our

goal in this scoping review is to summarize and analyse the digital citizenship assessment techniques used to assess students' digital citizenship skills.

The findings of this review and suggestions may eventually benefit students, educators and school management in implementing and executing educational programmes that promote students' digital citizenship competencies in schools.

2. Defining Digital citizenship and competency

Mike Ribble is an early author who established digital citizenship competencies for education He defines digital citizenship as norms for the appropriate and responsible use of online technologies. Its digital citizenship competencies include nine elements: digital access, digital commerce, digital communication, digital literacy, digital etiquette, digital law, digital rights and responsibilities, digital health and well-being, and digital security (Ribble & Bailey, 2004a; 2004b; 2007). According to Mossberger (2008), digital citizenship is the ability to participate in an online, digital society. Alberta Education (2012) defines citizenship as belonging to a national, political, or social group. The community is the focus. Community shapes citizenship. Community members have rights and obligations, coupled with accountability. Community members must follow their duties. Digital citizenship fits within this concept with few modifications. Mitchel defines digital citizenship as respectful and tolerant behaviour that promotes civic involvement. He focuses on two elements: online respect and online civic engagement (Jones & Mitchell, 2016). Choi (2016) introduces four digital citizenship (DC) teaching methods; first, the ethical approach teaches basic digital society skills, second. the media literacy approach develops critical information access and use skills, third, the participation/engagement approach encourages citizens to create content and contribute to social, cultural, and economic life online, and fourth, the critical resistance approach encourages DC to choose platforms that promote values and participate in creating an online community. Choi's digital citizenship competencies includes internet political activism, technical skills, local and global awareness, critical perspective, and networking agency (Choi, 2017). Kim and Choi (2018) argue that digital citizenship education extends beyond obligations or duties and established SAFE Framework: self-identity in the digital environment, activity online, fluency with digital tools, and ethics for the digital environment. Martin et al. (2020) define DC as a set of responsible habits on how to function in a digital and offline space, which consists of five aspects: cyberbullying, digital footprint, digital privacy, digital netiquette, and digital identity (Kim & Choi, 2018).

Chen et al. (2021) conceptualised digital citizenship largely in terms of competency and participation. The competence view focuses on citizens' online skills in using technology and the Internet for social, cultural, and economic participation, such as accessing the Internet, evaluating information, communicating, and collaborating with people from various backgrounds (Choi, 2016; Ribble & Bailey, 2007). This competence-based approach divides digital citizenship into several components, including digital literacy, digital interaction, digital communication, digital safety, digital ethics, digital rights and responsibilities, digital law, digital commerce, and digital health (Ribble & Bailey, 2004b; 2007). Alternatively, Kim and Choi (2018) offered a digital citizenship framework based on individual competency, emphasising "ethics for the digital environment, fluency for the digital environment, rational and active activities, and establishing self-identity in a digital world" (Kim & Choi, 2018). Researchers have mostly employed competency frameworks to assess or evaluate, particularly in education. Fewer studies employ the participation perspective of digital citizenship, which connects it to any economic, social, or political involvement in the digital/online environment (Harrison & Polizzi, 2022; Mossberger et al., 2008)

2.1 Frameworks of digital citizenship competency

The various global institutes are also enlisted digital citizenship competencies. The International Society for Technology in Education (ISTE), based on the research of Ribble and Bailey (2011), has identified five specific competences for digital citizenship: Inclusive, Informed, Engaged, Balanced, and Alert. The Council of Europe has divided digital citizenship competencies into three groups, consisting of ten competencies in total; being online, wellbeing and right online. The concept of being online consists of three elements: access and inclusion, learning and creativity, and media and information literacy. Wellbeing online consists of three components: ethics and empathy, health and well-being, and e-presence and communication. Right online consists of four elements: active participation, rights and responsibilities, privacy and security, and consumer awareness (Mulyono et al., 2021). The DQ Institute (DQI), a global organization dedicated to digital education, has enlisted eight elements for digital citizenship competencies; these include digital citizen identity, screen time management, cyberbullying management, cyber security management, privacy management, critical thinking, digital footprints, and digital empathy (DQI, 2017). Common Sense Media, a non-profit organization, has enumerated six digital citizenship competencies: media balance and well-being, privacy and security, digital footprint and identity, relationships and communication, cyberbullying, digital drama and hate speech, and news and media literacy (James & Weinstein, 2019; Mulyono et al., 2021). Most of the above frameworks makes use of Ribble and Bailey's (2011) works.

3. Method

A scoping review is a type of literature review that aims to map out and summarize the existing literature on a particular topic or research question (Davis, 2019). It is based on Arksey and O'Malley's (2005) framework. There are five steps in the method: "1) Identifying the research question; 2) Identifying relevant studies; 3) Study selection; 4) Charting the data; 5) Collating, summarizing, and reporting the results" (Arksey & O'Malley, 2005, p. 22).

A scoping review studies was conducted to gain knowledge on measuring instruments of Digital Citizenship Competence in Schools. Inclusion and exclusion criteria are shown in Table 2.

The criteria used to select the final databases for this scoping review included the relevance of the topic, the type of articles available, and the accessibility of the databases. Ultimately, the scientific databases included in this review were Google scholar, ERIC, Pubmed, Science direct, Proquest, and Jstor.

The search for research articles was conducted using Boolean connectors with the following keywords: digital citizenship, school, students, learners, education, citizenship, competency, measurement. We used the following search string: (digital citizenship OR cyber citizenship OR e-citizenship) AND (competence OR skills OR competencies) AND (measurement OR assessment OR evaluation) AND (learners OR education OR students) AND (elementary schools OR middle schools OR secondary schools OR schools).

4. Results

A search turned up 309 articles. After the identification process, 98 duplicate articles were eliminated. Next, after running keyword filters through the titles of the 220 studies that were still in the database, it was found that 210 of them did not meet the inclusion criteria for the following reasons: 71 papers did not resemble the search term; 47 titles and abstract criteria were deemed

irrelevant; 33 studies did not belong to the population; 36 studies did not have any context-relevant information; 7 books; 5 conference papers; and 10 papers were not peer reviewed. Due to their compliance with all inclusion criteria, the remaining 12 articles were found appropriate for the study. Ultimately, these articles underwent a thorough review process, and their relevance to the study was confirmed by obtaining the full versions. The articles were chosen using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement as a guide, as shown in Figure 1 (Moher et al., 2009).

Table 3 lists studies on digital citizenship at the school level, including the author, year of publication, title, purpose of the theoretical or conceptual framework, participants or sample, methods, and key findings. We identified three data collection methods: test-type assessment, self-assessment, and performance-based assessment. In addition to other frameworks, schools widely use Ribble's and ISTE frameworks for assessment instruments to measure digital citizenship competence.

In our scoping review, we found other digital citizenship conceptual frameworks (shown in Table 1). In this review, we identified various assessments that evaluated digital citizenship competence among school students. A Likert-type scale questionnaire was used to measure participants' digital citizenship competency across different levels. Alazemi (2019) used a quasi-experimental study design was used to measure achievement levels, providing insights into the effectiveness of digital citizenship educational programs. Several researchers have used survey method to assess students' knowledge in specific areas of digital citizenship competence, covering a range of relevant topics. Instruments consisted several factors or dimensions covering the various aspects of digital citizenship competence shown in Table 3.

Table 2 - Inclusion and exclusion criteria.

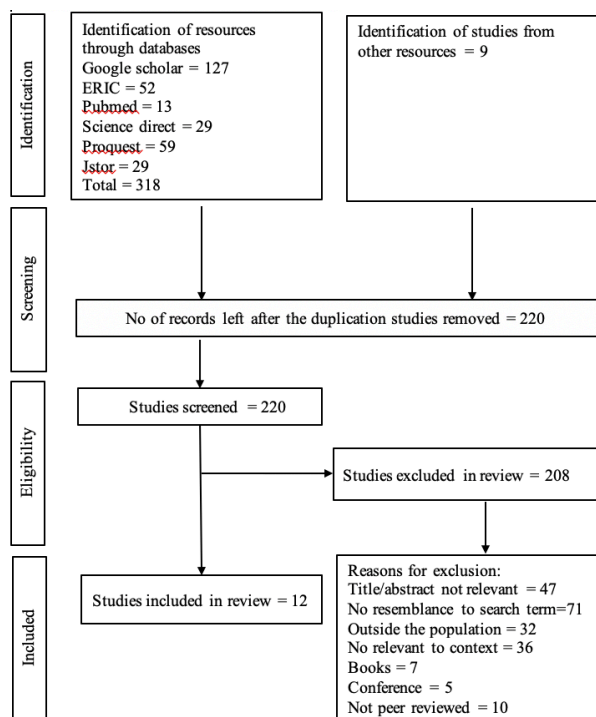| Criteria	Included	Excluded
Time frame	2012 - 2023	Before 2012 and after 2023
Publication type	Online peer – reviewed articles	Policy documents, books, Theses, working papers, reports, conferences
Focus	Studies focused on Digital citizenship for schools	Articles focusing on other topics
Languages	English	Other Languages
Target population	Studies focused among school students and digital citizenship competence measurement	Studies focusing on students' other population (preschool, adults, university students, special needs)
Articles	Empirical papers with research design, participants, data sources, data collection techniques, analysis procedures, and key findings	Review article, articles with no empirical studies, positioned papers

| | Identification of resources through databases
Google scholar = 127
ERIC = 52
Pubmed = 13
Science direct = 29
Proquest = 59
Jstor = 29
Total = 318 | Identification of studies from other resources = 9 |

Identification

No of records left after the duplication studies removed = 220

Screening

Studies screened = 220

Eligibility

Studies excluded in review = 208

Studies included in review = 12

Included

Reasons for exclusion:
Title/abstract not relevant = 47
No resemblance to search term=71
Outside the population = 32
No relevant to context = 36
Books = 7
Conference = 5
Not peer reviewed = 10

Figure 1 - PRISMA flow chart for inclusion criteria.

5. Discussion

A literature review was conducted to explore assessment tools for measuring students' digital competence. The review revealed that existing tests primarily focused on examining students' digital citizenship skills, abilities, and perception. Most assessment tools cover multiple competency dimensions and cover the various aspects of digital civic literacy listed in Table 3, including areas such as digital literacy, digital commerce, online etiquette, privacy and protection, etc. The majority of studies utilize self-assessment questionnaires with multiple-choice items to evaluate digital competence. The research findings indicate that the Ribble and Bailey's (2004a) framework for digital citizenship is the most frequently used framework in this context. Students often define digital citizenship as engaging in digital groups or activities, providing knowledge, and being ethically and socially accountable.

These notions are often expressed through digital abilities, such as reading online, sharing personal experiences on social media, and other digital activities. In addition, students practise many sorts of digital citizenship via language usage in digital citizenship activities (Alazemi et al., 2019).

The results of this study reveal students need help on the greater knowledge of appropriate online behaviour and develop or enhance a broad range of digital communication skills for a variety of purposes, informal and formal education, social networking, and digital wellbeing in social and cultural contexts. Studies have shown digital citizenship programmes have improved the students' perception of digital citizenship elements

(Alazemi et al., 2019). So, digital citizenship programmes can shape students' attitudes and habits towards digital citizenship activities. These results demonstrate that many students may utilise social media and their academic, social, and digital communication skills to make use in digital environment to facilitate socialising, studying, and personal growth. However, the advantages that young people get from utilising digital media might range greatly because everyone has varying access to technology and experiences with digital communication.

With regard to the critical aspects and social justice, this research review has revealed most of the students have hesitated to speak and share anything on social and political concerns. Moderate usage of technology could be one of the reasons why students do not discuss any political issues (Ananto & Ningsih, 2023). Social media has potential to attract cyber trolling and humiliations. So, such negative experience may hamper the political and social engagement of students in the digital environment.

The review is also has shown the fact that high use of technology leads to misuse of it. Digital technology misuse can lead to cyberbullying, addiction, false information dissemination, privacy invasion, and illegal activities. The widespread availability and accessibility of digital technology make it easy for students to engage in harmful activities. The anonymity provided by online platforms can encourage harmful behaviour, such as cyberbullying and trolling. The addictive nature of digital technology, particularly social media and online gaming, can lead to compulsive behaviour and excessive use, negatively impacting mental health, relationships, and overall well-being. The rapid spread of false information on digital platforms can exacerbate societal issues and undermine trust in institutions. The commodification of personal data and erosion of privacy rights raise concerns about surveillance, data breaches, and exploitation by corporations and governments. Therefore, it is crucial for students to be aware of their digital behaviour and use technology responsibly and ethically.

This review reaffirms how important it is for parents to teach their students responsible online behaviour and to keep them safe from online threats. Unmonitored smartphone use can put students at risk for cyber trolling, exposure to unhealthy content, hacking, and excessive screen time, among other negative outcomes. Their development, academic performance, and physical and mental well-being may all suffer as a result.

Excessive screen time can also impair mental health and sleep. Additionally, it can impair social abilities like creativity, and problem-solving. Parental supervision is essential to lowering these risks and teaching children appropriate online behaviour. Parents can monitor their children's online activity, set age-based computer time limits, and have conversations with their children about internet safety.

Table 3 - Characteristics students digital citizenship competence assessment.

	Author	Theoretical/Conceptual framework	Purpose	Participants/ sample	Methods	Key findings
1	Ananto & Ningsih, 2023	Five Dimensions proposed by Choi et al (2017): internet political activism, technical skills, local/global awareness, critical perspective, and network agency	To assess the perceptions and levels of digital citizenship among Indonesian educators and students.	157 participants (39 teachers and 118 secondary students)	Self-assessment report questionnaire with a five-point Likert scale ranging from strongly disagree (scored 1) to strongly agree (scored 5).	The study found that while internet usage helped understand social and political issues, teachers and students were less active in discussing them, and their political activity varied by age
2	Alazemi et al., 2019	Ribble & Bailey (2007): Digital Access, Digital Commerce, Digital Communication, Digital Literacy, Digital Etiquette, Digital Law, Digital Rights and Responsibilities, Digital Health and Wellness, and Digital Security.	To incorporate digital citizenship elements into language classes and assess the impact of exposure to these elements through interactive online international English content on tenth-grade writing performance	40 students selected from a basic school in Kuwait as two intact sections	A quasi-experimental followed by pre and post test-type assessment	The study found that students were uninformed about digital citizenship and its nine elements. The training improved writing performance, increased interaction, and participation
3	Purwanti et al., 2023	Ribble & Bailey (2005) and its nine dimensions: Digital Access, Digital Commerce, Digital Communication, Digital Literacy, Digital Etiquette, Digital Law, Digital Rights and Responsibilities, Digital Health and Wellness, and Digital Security.	tT evaluate students' perspectives regarding the integration of digital citizenship principles at the secondary school level	120 students from Middle Schools	Self-assessment questionnaire consisting of ten questions for students' attitudes towards the use of technology in school with a Likert scale from 1 to 5	The findings show that while digital citizenship is being implemented in secondary schools, moderate to high levels of technology usage are preferred by students. Increases in the use of digital media are correlated with higher levels of misuse
4	Aldosari et al., 2020	ISTE (2019) Dimensions: Digital identity, Ethical behavior, Intellectual property, and Digital privacy and security.	To assess the availability of ISTE Digital Citizenship standards among middle and high school students in Riyadh, Saudi Arabia	394 male middle and high school students in general education from the Riyadh Region	A self-assessment survey was used to collect data on the perceptions of students in	Students demonstrated high availability of digital citizenship in the first and second domains, as well as high level of Internet self-efficacy
5	Harmanto et al., 2022	Ribble & Bailey (2005) and its nine dimensions: Digital Access, Digital Commerce, Digital Communication, Digital Literacy, Digital Etiquette, Digital Law, Digital Rights and Responsibilities, Digital Health and Wellness, and Digital Security.	To examine Indonesian junior high school students' comprehension of Digital Citizenship	200 junior high school students in Indonesia	Quantitative, with a self-assessment survey design	The study highlights the need of including digital citizenship education into the curriculum. This education empowers students with the skills to navigate the digital world responsibly, comprehend online ethics, and promote a balanced use of technology
6	Martin et al., 2020	DC dimensions. Cyberbullying, Digital footprint, Digital privacy, Digital netiquette, and Digital identity	To assess middle school students' perspectives of digital citizenship components centred on online behaviour.	237 middle school students of United States	Survey Method with self-assessment	Students are increasingly using mobile devices, emphasising the need of parents monitoring their children's internet activity
7	Komalasari et al., 2023	Dimensions: Civic knowledge, Cognitive civic skills, Participatory civic skills, and Civic disposition	To explain the digital citizenship practices that junior high school students in digital citizenship	260 VIII grade students in Indonesia	Survey Method with self-assessment	Awareness and comprehension of digital citizenship of students are rated as "Extremely Good"
8	Prasetiyo et al., 2021	Ribble (2015) and its nine dimensions: Digital Access, Digital Commerce, Digital Communication, Digital Literacy, Digital Etiquette, Digital Law, Digital Rights and Responsibilities, Digital Health and Wellness, and Digital Security.	To study the digital citizenship competence of senior high school students	581 students from from 12 public and private senior high schools of Indonesia	Self-assessment survey method with 5-point Likert Scale (5 = Strongly Agree, 1 = Strongly Disagree).	Measured digital citizenship readiness of students was very high. The study data could be used in future

(continue)

	Author	Theoretical/Conceptual framework	Purpose	Participants/ sample	Methods	Key findings
9	Çepni et al., 2014	Ribble & Bailey (2007) and its nine dimensions: Digital Access, Digital Commerce, Digital Communication, Digital Literacy, Digital Etiquette, Digital Law, Digital Rights and Responsibilities, Digital Health and Wellness, and Digital Security.	To explore the perspectives of elementary school students concerning internet usage (digital citizenship)	557 8th grade students of 6 primary schools	Survey model with self-assessment	The study revealed that internet availability, email address, mother's education, family income, internet use history, and father's education significantly influence primary school 8th graders' digital citizenship attitudes
10	Çebi & Özdemir, 2019	Dimensions 1. Digital communication and literacy 2. Digital Security 3. Digital etiquette and law	To explore how digital nativity and digital citizenship relate to strategies used for online information searches	331 high school students	Self-assessment with a 7-point Likert scale	The study found that online information search strategies were mainly influenced by "digital communication and literacy" levels, with "digital security" being important across all sub-dimensions. However, "digital etiquette and law" were not statistically significant predictors. Additionally, "comfort with multi-tasking" and "reliance on graphics for communication" significantly determined behavioral domain strategies
11	Ahmed Hassan, 2021	Three dimensions: 1. the respect values 2 the values of educating 3. dimension measures protection values	To examine how secondary schools in Saudi Arabia are promoting the principles of digital citizenship among students during the Coronavirus outbreak	3591 boys and girls, students from private secondary and government schools	Questionnaire Design with 5-point Likert Scale	Secondary schools significantly promote digital citizenship values, preparing students for the digital society and its technologies, with private schools playing a greater role in this. Male students are more aware of secondary schools' role in promoting digital citizenship.
12	Hassan et al., 2023	Ribble & Bailey (2007) and its nine dimensions: Digital Access Digital Commerce Digital Communication Digital Etiquette Digital Health & Wellness Digital Law Digital Literacy Digital Rights & Responsibilities Digital Security	This research assesses Malaysian students' perceptions of their digital citizenship practices in nine elements	398 high school students	Survey design with self-assessment	The study found that students are moderately practicing digital citizenship, with Digital Access and Digital Health and Wellness being the least frequent elements, and frequent practice significantly contributes to their overall wellness.

However, because technology is changing so quickly, many parents might not know how to keep an eye on their children's online activity. Educational initiatives can help with this problem by giving parents the knowledge and resources they need to keep their kids safe online. Classes, lectures, online courses, and instructional materials covering subjects like setting up parental controls, promoting safe online behaviour, and fostering positive digital habits are some examples of these programs. By giving parents the knowledge and resources they need, we can make sure that students can navigate the digital world in a responsible and safe manner (Martin et al., 2020).

6. Conclusion

Students' screen time is increasing every day. By and large, students have access to digital technologies in

schools and at home. Many schools have strict policies on how to use smart phones on campus. However, parents often fail to adequately monitor their children at home. One of the main reasons could be that many parents, who are digital immigrants, lack knowledge about how to use smart phones effectively. They rely on their children for online activities such as shopping, bank transactions, booking tickets, and so on. Therefore, it is crucial to educate parents on the fundamentals of digital literacy and citizenship. Society's use of digital and internet technologies is increasing day by day. Therefore, schools must find ways and means to adapt curriculum to changing technologies. Schools must systematically implement digital citizenship programmes. The main idea behind digital citizenship is that everyone who lives in the digital world should make it a better place. This includes having good interactions online, following the rules that apply in the digital world, and learning how to keep yourself safe online. This review shows students by and large do not have sufficient knowledge on cyberbullying and proper internet behaviour (Komalasari et al., 2023). This supports Martin's (2020) assertion that many public schools fail to teach digital citizenship (Martin et al., 2020). Therefore, we need to do more to prepare students for appropriate and responsible behaviour in an online environment.

7. Recommendations

The results of this research have far-reaching implications for everyone involved in the education system, such as parents, teachers, students, and administrators. With the increasing adoption of digital technologies and social media among students, it is critical for all groups to take the lead in promoting responsible digital citizenship behaviour. The results of this research highlight how important it is for students to understand the basics of digital citizenship while interacting with others online. Students need to be aware of the ethical issues, privacy issues and social media standards associated with online communication as they frequently use digital technologies and social media platforms. Students can navigate the digital environment safely and ethically by developing their knowledge as digital citizens, reducing the likelihood of disinformation, cyberbullying and data breaches. The results of this research also have implications for teachers, as they contribute significantly to students' learning and development in the area of digital citizenship. Teachers can successfully address these gaps in students' digital citizenship knowledge and skills by identifying the areas in which students are deficient. This could include using technology to promote digital literacy, combining interactive activities and conversations on online safety and ethics, and incorporating the ideals of digital citizenship into existing curriculum topics. To encourage students to practice digital citizenship, parents are also essential.

Parents should actively monitor their children's online activities and encourage an honest dialogue about internet safety and appropriate digital behaviour. Parents can help reduce the dangers associated with excessive screen time, cyberbullying, and exposure to inappropriate information by keeping an eye on their children's online activity and offering advice and support when needed. Additionally, school administrators are critical in driving initiatives to support digital citizenship in learning environments. By implementing a comprehensive digital citizenship curriculum that covers all grade levels and subject areas, administrators can ensure that every student receives consistent and relevant education in this important area. Administrators can also help teachers integrate the ideals of digital citizenship into their lesson plans, provide professional development opportunities for teachers, and form alliances with community organizations and parents to promote digital citizenship education.

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References

Ahmed Hassan, M. (2021). *The Role of Secondary School in The Development of the Values of Digital Citizenship for Students Under the Coronavirus Pandemic (Covid-19). 7.* https://doi.org/10.5281/zenodo.4628349

Alazemi, A. F., Sa'di, I. T., & Al-Jamal, D. A. H. (2019). Effects of digital citizenship on EFL students' success in writing. *International Journal of Learning, Teaching and Educational Research*, *18*(4), 120–140. https://doi.org/10.26803/ijlter.18.4.7

Alberta Education (2012). Alberta education cataloguing in publication data, digital citizenship policy development guide. In *School Technology Branch*. https://eric.ed.gov/?id=ED544723

Aldosari, F.F., Aldaihan, M.A., & Alhassan, R.A. (2020). Availability of ISTE Digital Citizenship Standards Among Middle and High School Students and Its Relation to Internet Self-Efficacy. *Journal of Education and Learning*, *9*(5), 59. https://doi.org/10.5539/jel.v9n5p59

Ananto, P., & Ningsih, S.K. (2023). An examination of Indonesian teachers' and students' perception and level of digital citizenship. *Heliyon*, *9*(8). https://doi.org/10.1016/j.heliyon.2023.e18987

Arksey, H., & O'Malley, L. (2005). Scoping studies: Towards a methodological framework. *International Journal of Social Research Methodology: Theory and Practice*, *8*(1), 19–32. https://doi.org/10.1080/1364557032000119616

Çebi, A., & Özdemir, T.B. (2019). The role of digital nativity and digital citizenship in predicting high school students' online information searching strategies. *Egitim ve Bilim*, *44*(200), 47–57. https://doi.org/10.15390/EB.2019.8379

Çepni, O., Oğuz, S., & Kilcan, B. (2014). *Primary school students' views of digital citizenship*. https://www.researchgate.net/publication/34807709 0_Primary_school_students'_views_of_digital_citiz enship

Chen, L.L., Mirpuri, S., Rao, N., & Law, N. (2021). Conceptualization and measurement of digital citizenship across disciplines. In *Educational Research Review* (Vol. 33). Elsevier Ltd. https://doi.org/10.1016/j.edurev.2021.100379

Choi, M. (2016). A Concept Analysis of Digital Citizenship for Democratic Citizenship Education in the Internet Age. *Theory and Research in Social Education*, *44*(4), 565–607. https://doi.org/10.1080/00933104.2016.1210549

Choi, M., Glassman, M., & Cristol, D. (2017). What it means to be a citizen in the internet age: Development of a reliable and valid digital citizenship scale. *Computers and Education*, *107*, 100-112. https://doi.org/10.1016/j.compedu.2017.01.002

Common Sense and media (2019). The Common Sense census: Media use by tweens and teens 2019. Retrieved from: https://www.commonsensemedia.org/research/the-common-sense-census-media-use-by-tweens-and-teens-2019

Davis, A. (2019). *Digital Citizenship in Ontario Education: A Concept Analysis*. www.ineducation.ca

DQI (2017). *Digital intelligence: A conceptual framework & methodology for teaching and measuring digital citizenship*. https://www.dqinstitute.org/wp-content/uploads/2017/08/DQ-Framework-White-Paper-Ver1-31Aug17.pdf

Harmanto, H., Ghofur, M.A., Sukardani, P.S., Prahani, B.K., & Saphira, H.V. (2022). Exploring Digital Citizenship Awareness among Middle School Students in Surabaya: An Empirical Study on Current Perspectives and Educational Implications. *International Journal of Emerging Research and Review*, *1*(4), 000050. https://doi.org/10.56707/ijoerar.v1i4.50

Harrison, T., & Polizzi, G. (2022). (In)civility and adolescents' moral decision making online: drawing on moral theory to advance digital citizenship education. *Education and Information Technologies*, *27*(3), 3277–3297. https://doi.org/10.1007/s10639-021-10710-0

Hassan, A., Atikah Ahmad, N., & Intan Sharina Syed Abdullah, S. (2023). *Examination of Digital Citizenship Level and Its Relationship to Holistic Wellness among High School Students in Malaysia*. https://doi.org/10.6007/IJARBSS/v13-i12/20131

iKeepSafe. *Internet Keep Safe Coalition*. Retrieved from https://ikeepsafe.org/

International Society for Technology in Education (2019). ISTE standards for students. Retrieved from https://www.iste.org/standards/for-students

James, & Weinstein, E. (2019). Teaching digital citizens in today's world: Research and insights behind the common sense K-12 . *Common Sense Media*.

Jones, L.M., & Mitchell, K.J. (2016). Defining and measuring youth digital citizenship. *New Media and Society*, *18*(9), 2063–2079. https://doi.org/10.1177/1461444815577797

Kim, M., & Choi, D. (2018). International Forum of Educational Technology & Society Development of Youth Digital Citizenship Scale and Implication for Educational Setting. *Source: Journal of Educational Technology & Society*, *21*(1), 155–171. https://doi.org/10.2307/26273877

Komalasari, K., Abdulkarim, A., & Iswandi, D. (2023). *Students' Digital Citizenship at Junior High School in Bandung Indonesia* (pp. 885–892). https://doi.org/10.2991/978-2-38476-096-1_92

Lindsey, L. (2015). *Preparing teacher candidates for 21st century classrooms: A study of digital citizenship*. Arizona State University.

Marshall, T.H. (1950). *Citizenship and social class, and other essays*.

Martin, F., Hunt, B., Wang, C., & Brooks, E. (2020). Middle School Student Perception of Technology Use and Digital Citizenship Practices. *Computers in the Schools*, *37*(3), 196–215. https://doi.org/10.1080/07380569.2020.1795500

Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., Antes, G., Atkins, D., Barbour, V., Barrowman, N., Berlin, J. A., Clark, J., Clarke, M., Cook, D., D'Amico, R., Deeks, J. J., Devereaux, P. J., Dickersin, K., Egger, M., Ernst, E., Gøtzsche, P. C., … Tugwell, P. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. In *PLoS Medicine* (Vol. 6, Issue 7). Public Library of Science. https://doi.org/10.1371/journal.pmed.1000097

Mossberger, Karen., Tolbert, C.J., & McNeal, R.S. (2008). *Digital citizenship : the internet, society, and participation*. MIT Press. https://doi.org/10.1080/19331680802290972

Mulyono, B., Affandi, I., Suryadi, K., & Darmawan, C. (2021). *Digital Citizenship Competence: Initiating Ethical Guidelines and Responsibilities for Digital Citizens*.

Ohler, J. (2011). Digital Citizenship Means Character Education for the Digital Age. *Kappa Delta Pi Record, 47*(sup1), 25-27. https://doi.org/10.1080/00228958.2011.10516720

Pandian, N., Balasubramaniam, M., & Narmatha, P. (2023). *Digital Citizenship in Education*. https://www.researchgate.net/publication/371700156

Payne, J. L. (2016). *A case study of teaching digital citizenship in fifth grade*. The University of Alabama.

Prasetiyo, W. H., Naidu, N. B. M., Sari, B. I., Mustofa, R. H., Rahmawati, N., Wijaya, G. P. A., & Hidayat, O. T. (2021). Survey data of internet skills, internet attitudes, computer self-efficacy, and digital citizenship among students in Indonesia. *Data in Brief, 39*. https://doi.org/10.1016/j.dib.2021.107569

Purwanti, L., Hidayani, S., & Oktaviana, F. (2023). Attitudes Towards the Implementation of School Digital Citizenship. *EDUKASI: Jurnal Pendidikan Islam (e-Journal), 11*(2), 363–381. https://doi.org/10.54956/edukasi.v11i2.455

Ribble, M. (2009). *Raising a digital child: A digital citizenship handbook for parents*. International Society for Technology in Education.

Ribble, M. (2015). Digital citizenship in schools: Nine elements all students should know. International Society for Technology in Education.

Ribble, M. S., & Bailey, G. (2004a). Digital citizenship focus questions for implementation. *Learning & Leading with Technology, 32*(2), 12-15.

Ribble, M., & Bailey, G. (2004b). Feature Focus Questions for Implementation. In *Learning & Leading with Technology* (Vol. 32). http://www.iste.org/

Ribble, M. S., & Bailey, G. D. (2005). Developing ethical direction. *Learning & Leading with Technology, 32*(7), 36-38.

Ribble, M., & Bailey, G. (2007). *Digital Citizenship In Schools* (1st ed.). International Society for Technology in Education.

Ribble, M. & Bailey, G. (2011). *Digital Citizenship in Schools* (2nd Ed.). International Society for Technology in Education.