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## Science Mapping Research on Digital Citizenship Research in Education

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This study aimed to unearth the status of the educational research dimension of the digital citizenship literature through the studies scanned in the education research category in the WoS database and whose author keywords include digital citizenship. For this purpose, 96 studies were examined. The data set was extracted from WoS database. A bibliometric analysis was conducted for a holistic review of the subject area. The data was analyzed using VOSviewer software. First, the distribution of studies on digital citizenship by years and publication types is reported. Within the scope of bibliometric analysis, first, citation analysis was performed. To reveal the most cited articles, authors, journals, institutions, and countries on digital citizenship. Also, by using the citation analysis, the authors, journals, institutions, and countries that have published the most studies on digital citizenship are reported. In the current study, a co-author analysis was also performed and the most collaborating institutions on digital citizenship and the most co-cited authors on digital citizenship were studied. In addition, the most used author keywords in studies on digital citizenship were revealed by using a common word analysis. The results of the current study might constitute a guide for further research on digital citizenship.

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## Introduction

The 21st century, which can also be called the information age, has shaped the lives of individuals depending largely on the developments in technology. In this time period, people have started to use the advanced technologies brought more frequently, and especially with the inclusion of internet technologies in human life, technology has become one of the main factors that influence developments in the fields of health, education, communication, media,

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politics, and industry (Firat, 2016). In addition, thanks to the internet, individuals have been able to share their knowledge, experience, thoughts, and feelings with the masses, and have been able to have information about events occurring anywhere in the world in a very short time (İmer & Kaya, 2020). In recent years, digital tools that have entered our lives in parallel with the development of technology allow people to prepare photos, videos, and stories, share drawings or opinions and make joint projects with people from different parts of the world in virtual environments such as social media (Fingal, 2020). On the other hand, the use of digital tools has become a necessity, particularly in the early days of the COVID-19 pandemic process, which still has its effects; students have used digital tools extensively both in their classes and at home (Ranchordas, 2020).

The integration of digital technology into almost all of daily life affects the way students interact with the world and how they react to the world. A recent study found that young people between the ages of 15 and 24 tend to use social networking sites, while 75% of Canadians aged 15-34 use digital technology to stay informed about current events. This is also the case in many nations except for underdeveloped ones (Davis, 2020). Since individuals use technology intensively on a daily basis, there must be a preparation that will enable them to communicate and cooperate securely and effectively in online environments. Based on this idea, it is possible to argue that secure and responsible online communication and cooperation have paved the way for the concept of digital citizenship to come to the forefront (Ranchordas, 2020; Ribble et al., 2004; Ribble, 2008; Shelley et al., 2004). As in every field, the increase in digitalization in education and social life has made it necessary to determine the behaviors required in this new environment (Payne, 2016). The fact that individuals adopt ethical attitudes in the digital environment, protect themselves against possible threats and increase their security measures has shaped their lifestyles and in this context, the concept of digital citizenship has started to be used more and more (Som-Vural & Kurt, 2018).

Citizenship in the digital world may not necessarily refer to adherence to the norms and ethical rules of a single nation. Global norms and rules are necessary to become a citizen. Therefore, the current structure of the world has revealed the concept of global citizenship that embraces the whole world. In this regard, it would not be wrong to state that every global citizen can become a digital citizen when they act responsibly to communicate and search for information using the internet (Dedebali & Daşdemir, 2019). This new dimension of communication has brought with it the concept of a new society that is described as a "network society" and the individuals living in this society have been seen as digital citizen candidates (Castells, 2000). In particular, the COVID-19 epidemic, the effects of which continue today, has created an opportunity to further strengthen students' online learning experiences and internalize a harmonious understanding of digital citizenship.

According to Mattson and Curran (2017), who emphasized the use of digital citizenship for more than a decade and explained that schools should encourage digital citizens, although it is important to do this, educators do not have a common understanding of defining digital citizenship. While digital citizenship is embraced as an identity that often arises in the context of digital trends and social integration, what it means to be a digital citizen has different connotations depending on who is referring to the term. Abowitz and Harnish (2006) emphasize that even the term "citizenship" alone has multiple meanings with complex historical, political, and social influences. Digital citizenship, on the other hand, is a new concept that does not have a history that differs it from all other definitions of citizenship. Although various definitions of digital citizenship have been made, the result that emerges

from all definitions is that digital citizenship is the ability to apply the rules of using digital technologies. More technically, it is considered a norm of behavior that manages the appropriate and responsible use of technologies (Ribble, 2012).

Digital citizenship can be enhanced by teachers instructing students on a range of digital practices, including how to access digital media, comply with copyright and other laws, and improve security measures (Jones & Mitchell, 2016). Tan (2011) refers to digital citizenship as a set of rules for the correct and responsible use of technology that guide students on how to navigate the online world in their personal and academic lives, rather than just being a citizen of a country. Ribble and Bailey (2007) define digital citizenship as the online demonstration of behaviors that ensure the legal, safe, ethical, and responsible use of information and communication technologies. In summary, the concept of digital citizenship addresses the level of responsibility of the individual in line with the responsible and appropriate use of digital tools (Mossberger et al., 2007). Although the definitions of digital citizenship have common aspects, it is also determined that some definitions are disconnected from each other (Choi, 2016). This inconsistency in creating a definition of digital citizenship poses some problems as it deprives policymakers, educators, and students of clear guidance on how to teach digital citizenship and apply it to life.

According to Ribble (2012), digital citizenship is centered around two ideas at the theoretical level. In the first of these, digital citizenship was evaluated as the responsible use of digital technology by the individual. This approach encompasses the behaviors and actions necessary to use digital technology in schools, whether related to technology or not. This idea, put forward by Ribble, has been dubbed "personally responsible digital citizenship" by some researchers (Krutka & Carpenter, 2017; Mattson & Curran, 2017). This personally responsible digital citizenship model is used by researchers, particularly in the development of digital citizenship scales (İşman & Güngören, 2014; Kim & Choi, 2018). On the other hand, proponents of the second approach called "critical digital citizenship" (e.g., Choi, 2016) opposed limiting the role of digital citizens to the use of responsible digital technology only, instead, they consider digital citizenship as an extension of democratic citizenship.

There are various studies in the field that examine the research base on digital citizenship (e.g. Sánchez et al., 2019; İmer & Kaya, 2020; Fernández-Prados et al., 2020; Kaur, 2021; Richardson et al., 2021; Taşkıran, 2021; Öztürk, 2021). Sánchez et al. (2019), for instance, discussed the studies on digital citizenship (Spanish and English) in various databases (Science Direct, Redalyc, Eric, ISI, Proquest, Scopus, Emerald, Dialnet, and Ebsco) between 2007 and 2017 in terms of the concept of digital citizenship and the trends of studies on the subject. İmer and Kaya (2020) aimed to identify the trends and gaps in this field by examining the articles, masters and doctoral theses on digital citizenship in Turkey. Fernández-Prados et al., (2020) examined the studies included in the WoS database using the keyword "digital citizenship" without restricting the type of publication. They discussed the relevant publications in terms of keyword analysis, co-authorship, and contributions of countries to the research topic. Kaur (2021) examined the articles on digital citizenship in the Scopus database between 2002 and 2021 with bibliometric analysis. Richardson et al., (2021) examined the studies on digital citizenship between 2004-2019 in terms of publication year, the most published journals and authors, study group, research method, and data collection tools. Taşkıran (2021) examined the digital citizenship studies included in the WoS database between 1975 and 2019 in terms of publication type, the most used keywords, the distribution of publications by years, authors who produced the most publications, institutions, and the most cited authors. Öztürk (2021) examined the studies on digital citizenship by classifying

them into four dimensions: studies on the concept of digital citizenship and its elements, studies in which the levels or perceptions of participants were determined, studies in which curricula were examined in terms of digital citizenship and studies on digital citizenship teaching.

Unlike the studies mentioned above, this study aimed to reveal the status of the educational research dimension of the digital citizenship literature by especially focusing on the studies scanned in the education research category in the WoS database and whose author keywords include digital citizenship. In other words, the current study offers a different perspective from previous studies by focusing only on studies in the field of education whose main target is digital citizenship. In the present study, a bibliometric analysis of studies on digital citizenship was performed to examine the relevant subject area holistically. In this regard, this study aims to answer the following research questions:

- (1) How is the distribution of published studies on digital citizenship in the field of education by years?
- (2) How is the distribution of published studies on digital citizenship in the field of education by types of studies?
- (3) What are the most cited studies among the published studies on digital citizenship in the field of education?
- (4) Which are the most productive authors, journals, institutions, and countries and the most influential authors, journals, institutions, and countries on digital citizenship in the field of education?
- (5) Which institutions have the strongest cooperation on digital citizenship in the field of education?
- (6) What are the most used author keywords in studies on digital citizenship in the field of education?
- (7) What is the case of co-citations of authors on digital citizenship in the field of education?

## **Methodology**

### ***Research Design***

In this study, studies on digital citizenship in the WoS database indexes in the field of education and educational research were examined by the bibliometric analysis method. The bibliometric analysis provides a comprehensive examination of the studies and findings obtained in a certain field (Zupic & Čater, 2015). According to Pritchard (1969), the bibliometric analysis aims to reveal the characteristics of studies in a certain field of study (branch of science, subject area, a certain journal, etc.) with mathematical and statistical methods. In this study, by using the keyword "digital citizenship", the relevant studies were examined by creating a holistic perspective with bibliometric analysis and visualizing them with contemporary bibliometric techniques.

### ***Data Collection***

Before the data set of the study was created, screening criteria for the study were determined. The purpose of determining the criteria is to ensure the reproducibility of the study and to reveal the difference between the current study from previous studies. In this

context, the keywords used in the search were determined as the first criterion. As a result of a detailed review of the relevant literature, we decided that the keywords "digital citizenship" would be sufficient for the search. The second criterion was to determine in which field the keywords would be scanned in the WoS database. In general, the bibliometric studies on the studies in the WoS database are searched by selecting the "topic" (searches title, abstract, author keywords) field. However, in reviews made by selecting the "topic" field, many irrelevant studies can also be listed. Because, in reviews made using the "topic" field, the study title, keywords, and abstracts of the studies are scanned. Since the abstract part is scanned, although the relevant study is not related to the research topic can be listed in the search results because only the keywords are mentioned in the abstract section.

In the current study, considering such concerns, a pilot scan was conducted by the researchers using the "topic" field and, thus, 493 studies were reached. These studies were examined and many unrelated publications were found. Therefore, to reach the main studies focused on the research subject, scanning in the "author keywords" area has been determined as the second criterion. As a result of this screening, 234 studies were reached. As the third criterion, the studies in the education and educational research category of the WoS database were selected. In determining this category, the fact that the fields of study of the researchers are educational sciences and educational research has been effective. After this criterion was determined, the number of publications obtained in the scan was 102. Another criterion was the determination of the publication year range. No restrictions were made in terms of publication language, type, and beginning and ending. However, since 2022 is not yet over, the year 2022 was excluded from the data set and the data set was created based on the 96 publications included in the study.

### ***Data Analysis***

In the study, first, the distribution of studies on digital citizenship was examined by years. Then the distribution of studies by types is discussed. Then, we continue with the bibliometric analysis. Within the scope of bibliometric analysis, first, citation analysis was performed. Using the citation analysis, the most cited articles, authors, journals, institutions, and countries on digital citizenship were revealed. Also, through the citation analysis, the authors, journals, institutions, and countries that have published the most studies on digital citizenship are reported. Then, a co-author analysis was performed and the most collaborative institutions on digital citizenship were found. Accordingly, the authors who were cited together on digital citizenship were examined using the co-citation analysis. Finally, through a the Co-word analysis, the most used author keywords were revealed in the studies on digital citizenship. The bibliometric data obtained for the 96 examined studies were analyzed using VOSviewer software. VOSviewer software creates networks and maps from bibliometric data and provides visualization of this data. This allows for a more detailed and comprehensive consideration of bibliometric data (van Eck and Waltman, 2014; 2019).

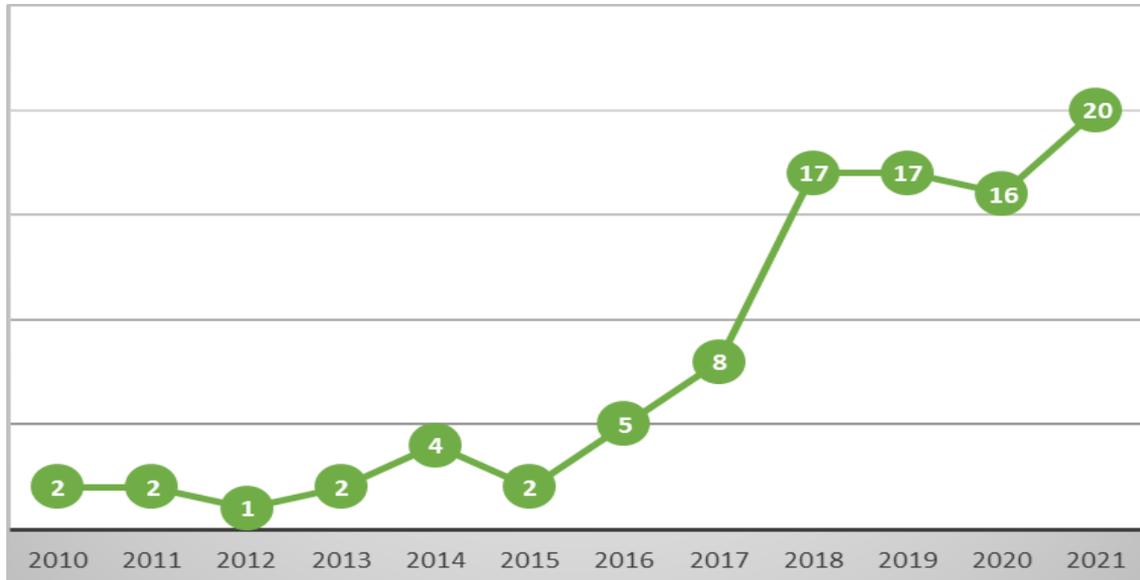
### **Findings**

In this study, a bibliometric analysis of the studies related to digital citizenship scanned in the category of education and educational research in the indexes in the WoS database was performed. The findings of the study are presented below.



*Distribution of publications by year*

According to the information obtained from the WoS database, the distribution of studies on digital citizenship in the category of education and educational research by year is presented in Chart 1.



**Chart 1.** Distribution of publications by year

As can be seen in Chart 1, the first publication in the indexes and categories related to digital citizenship was published in 2010. The increase in the number of publications follows a stagnant course from this year to 2015. As of 2016, the number of publications is entering a significant upward trend. Although there are occasional small fluctuations or stagnation, it is above a certain level after 2018. In general, studies on digital citizenship in the field of education shows an increasing trend.

*Distribution by publication type*

According to the information obtained from the WoS database, the distribution of studies on digital citizenship in the category of education and educational research by publication type is presented in Table 1.

**Table 1.** Publication type

Publication type	Number of publications
Articles	75
Proceedings Papers	17
Book Chapters	4
Total	96

As can be seen in Table 1, most of the publications in the indexes and categories related to digital citizenship are articles (n:75). Followed by proceedings papers (n:17) and book chapters (n:4).

### Most cited studies on digital citizenship

According to the information obtained from the WoS database, information on the 10 most cited studies on digital citizenship in the category of education and educational research category, is presented in Table 2.

**Table 2.** Most cited studies

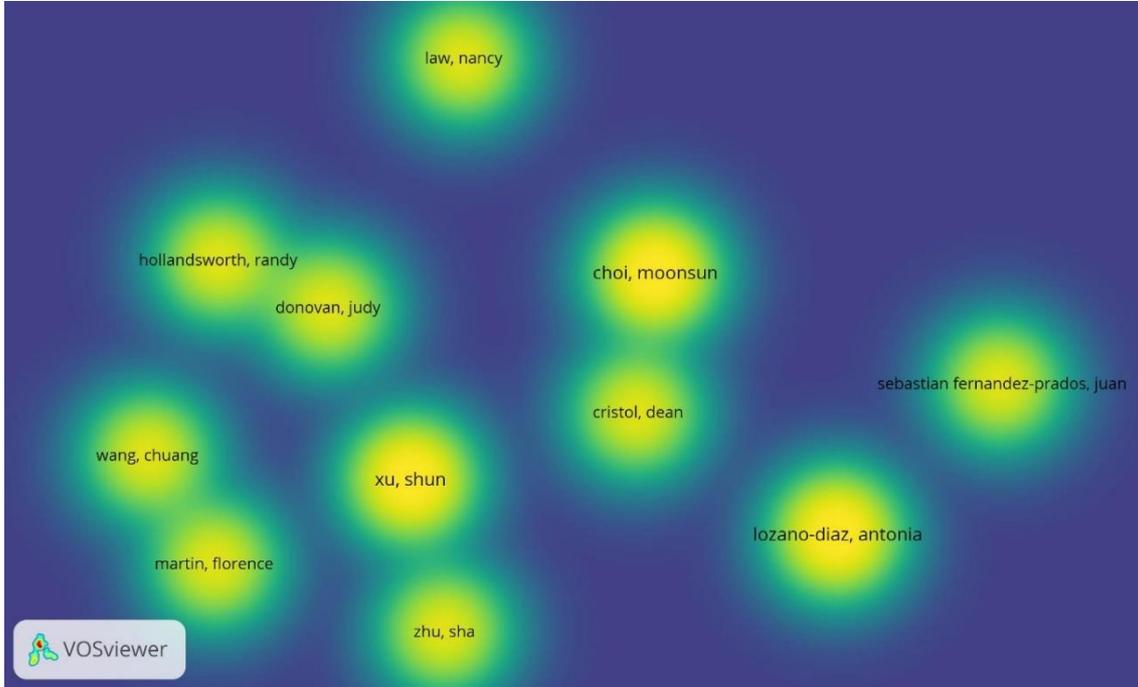
Article	Authors	Year	Journal name	Total Citations	Citation Average
1 A Concept Analysis of Digital Citizenship for Democratic Citizenship Education in the Internet Age	Choi, M.	2016	Theory & Research in Social Education	54	10.8
2 What it means to be a citizen in the internet age: Development of a reliable and valid digital citizenship scale	Choi, M. Glassman, M. Cristol, D.	2017	Computers & Education	52	13
3 Digital Citizenship with Social Media: Participatory Practices of Teaching and Learning in Secondary Education	Gleason, B. von Gillern, S.	2018	Educational Technology & Society	40	13.33
4 Towards a radical digital citizenship in digital education	Emejulu, A. McGregor, C.	2019	Critical Studies in Education	39	19.5
5 Digital Citizenship in K-12: It Takes a Village	Hollandsworth, R. Dowdy, L. Donovan, J.	2011	Techtrends Tech Trends	38	3.8
6 Middle School Students' Social Media Use	Martin, F. Wang, C. Petty, T. Wang, W. Wilkins, P.	2018	Educational Technology & Society	35	11.66
7 Interactive Youth and Civic Cultures: The Educational, Mediatc and Political Meaning of the 15M	Hernandez-Merayo, E. Robles, M.C. Martinez, J.B.	2013	Comunicar	33	4.12
8 Teachers as digital citizens: The influence of individual backgrounds, internet use and psychological characteristics on teachers' levels of digital citizenship	Choi, M. Cristol, D. Gimbert, B.	2018	Computers & Education	31	10.33
9 Personal Devices in Public Settings: Lessons Learned From an iPod Touch / iPad Project	Crichton, S. Pegler, K. White, D.	2012	Electronic Journal of E-Learning	28	3.11
10 Development of Youth Digital Citizenship Scale and Implication for Educational Setting	Kim, M. Choi, D	2018	Educational Technology & Society	24	8

As can be seen in Table 2, the study titled "A concept analysis of digital citizenship for democratic citizenship education in the internet age" by Choi (2016) is the most cited study, with 54 citations. In this study, the definition and meaning of the concept of digital citizenship are examined with the concept analysis technique. The study titled "Towards a radical digital citizenship in digital education" by Emejulu and McGregor (2019) has the highest citation average performance, with an average of 19.5 citations. In this study, the effects of the concept of radical digital citizenship on digital education and digital citizenship were examined. In addition, the definition of radical digital citizenship from the perspective of digital education has been tried to be made.



*The most published and cited researchers on digital citizenship*

According to the information obtained from the WoS database, the density map of the 10 researchers who have the most publications on digital citizenship in the education and educational research category is presented in Figure 1.



**Figure 1.** Most-published researchers

As can be seen in Figure 1, the most productive researchers on digital citizenship in the education and educational research category are “Choi, Moonsun” (n:3), “Lozano-Diaz, Antonia” (n:3), and “Xu, Shun” (n: 3). Apart from these researchers, the other researchers have 2 studies each.

According to the information obtained from the WoS database, the information of the 10 most cited researchers on digital citizenship in the category of education and educational research is presented in Table 3.

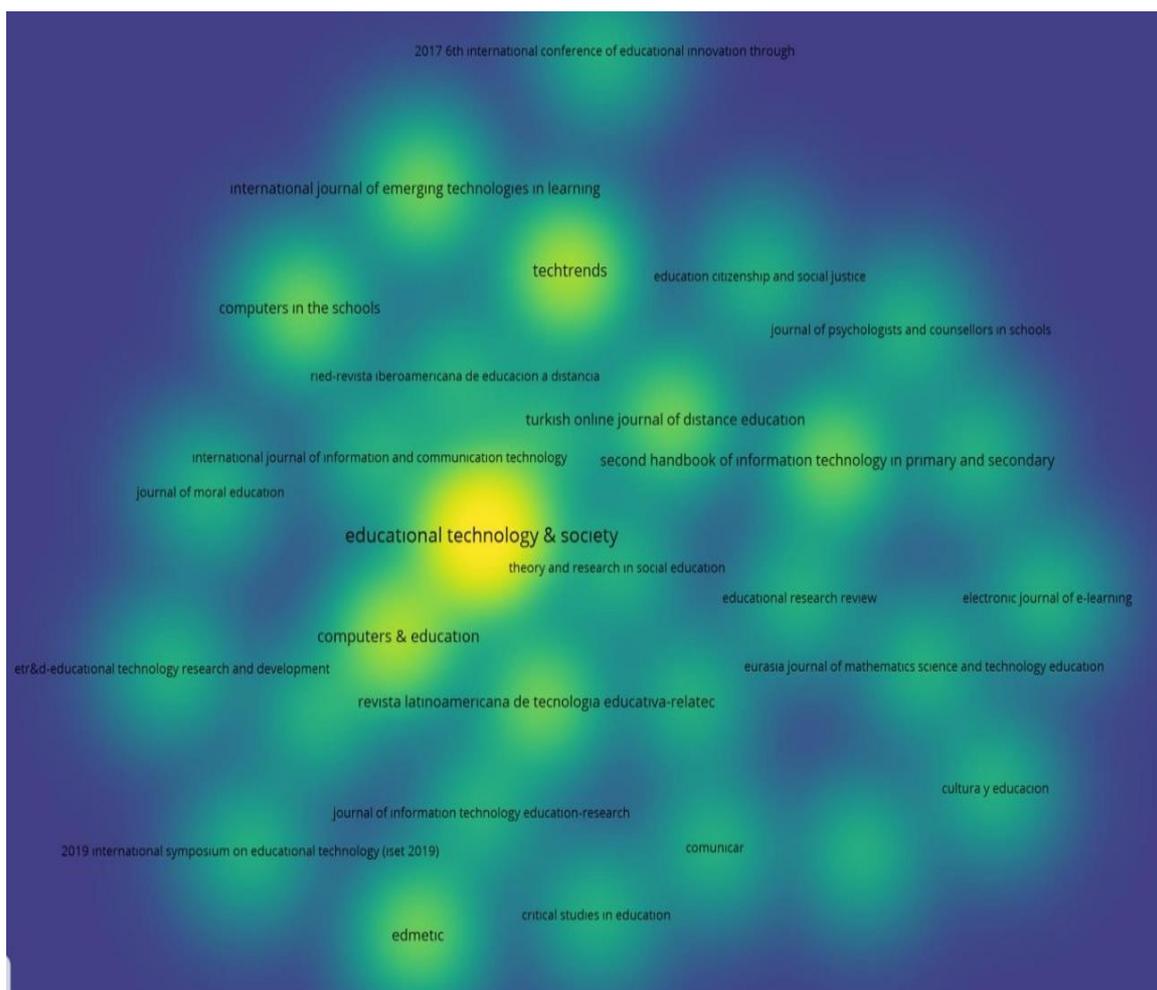
**Table 3.** Most cited researchers

	Author name	Number of citations	Number of publications	Mean citation
1	Choi, Moonsun	137	3	45.66
2	Cristol, Dean	83	2	41.5
3	Glassman, Michael	52	1	52
4	Donovan, Judy	48	2	24
5	Hollandsworth, Randy	48	2	24
6	Gleason, Benjamin	40	1	40
7	Von Gillern, Sam	40	1	40
8	Martin, Florence	39	2	19.5
9	Wang, Chuang	39	2	19.5
10	Emejulu, Akwugo	39	1	39

As can be seen in Table 3, the most cited researcher on digital citizenship is “Choi, Moonsun” with 137 citations. The same researcher is also at the top of the list of most productive researchers in terms of the number of publications (Figure 1).“Cristol, Dean” (n: 83) and “Glassman, Michael” (n: 52) are among other highly cited researchers. This situation shows parallelism with Table 2.

### *The most published and cited journals related to digital citizenship*

According to the information obtained from the WoS database, 34 journals published on digital citizenship in the category of education and educational research were reached. The density map of these journals is presented in Figure 2.



**Figure 2.** Journals with the most publications on digital citizenship

As can be seen in Figure 2, the "Educational Technology & Society" journal has been the journal with the most publications on digital citizenship, with 7 publications. Followed by the "Computers & Education" (n:3) journal and the "TechTrends" (n:3) journal.

According to the information obtained from the WoS database, the information of the 10 most cited journals on digital citizenship in the education and educational research category is presented in Table 4.

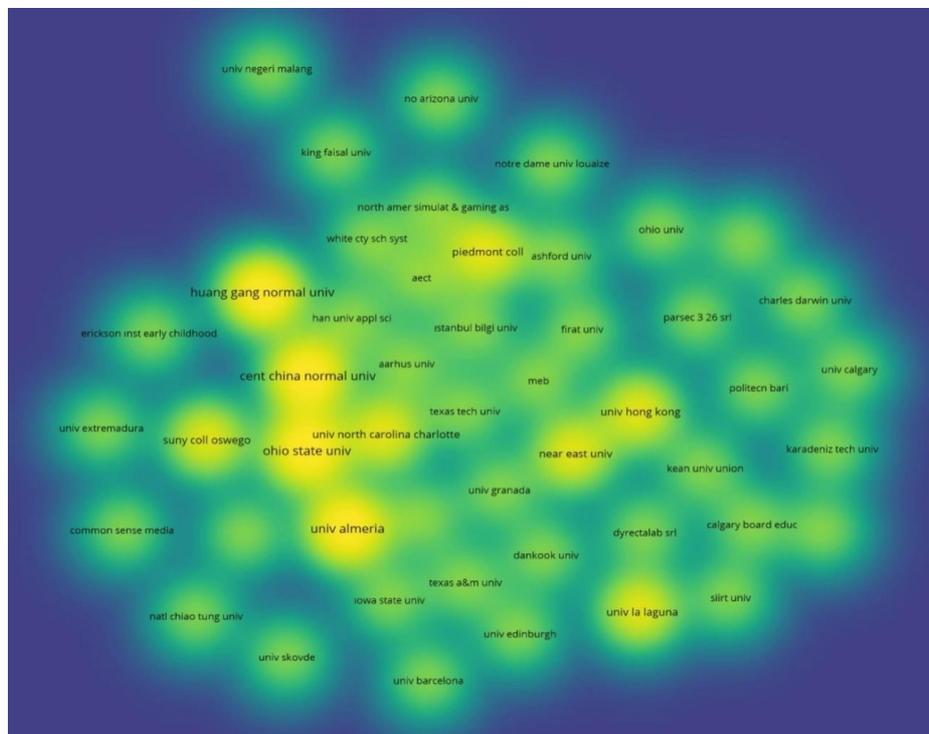
**Table 4.** Most cited journals

Journal name	Number of citations	Number of publications	Mean citation
1 Educational Technology & Society	146	7	20.85
2 Computers & Education	86	3	28.66
3 Theory and Research in Social Education	54	1	54
4 TechTrends	53	3	17.66
5 Critical Studies in Education	39	1	39
6 Comunicar	33	1	33
7 Electronic Journal of E-Learning	28	1	28
8 Revista Latinoamericana De Tecnologia Educativa (Relatec)	21	2	10.5
9 Education and Information Technologies	14	1	14
10 Education in the Knowledge Society	12	1	12

As can be seen in Table 4, the most-cited journal on digital citizenship is "Educational Technology & Society". Other effective journals with over 50 citations are "Computers & Education", "Theory and Research in Social Education" and "TechTrends". "Theory and Research in Social Education" is the journal with the highest mean citation. Apart from this journal, the first four journals are also among the most productive journals (Figure 2).

*The most published and cited journals related to digital citizenship*

According to the information obtained from the WoS database, 57 institutions that have published on digital citizenship in the category of education and educational research have been reached. The density map of these institutions is presented in Figure 3.



**Figure 3.** Institutions with the most publications on digital citizenship

As can be seen in Figure 3, “Ohio State University”, “Central China Normal University”,

“University of Almeria” and “Huang Gang Normal University” institutions have been the most productive institutions in digital citizenship with 3 publications each." Piedmont College", "The University of North Carolina at Charlotte", "University La Laguna", "University of Hong Kong", "Near East University" and "Suny College Oswego" have 2 publications each. Other institutions have 1 publication each.

According to the information obtained from the WoS database, the information of the top 10 institutions that have received the most citations on digital citizenship in the education and educational research category is presented in Table 5.

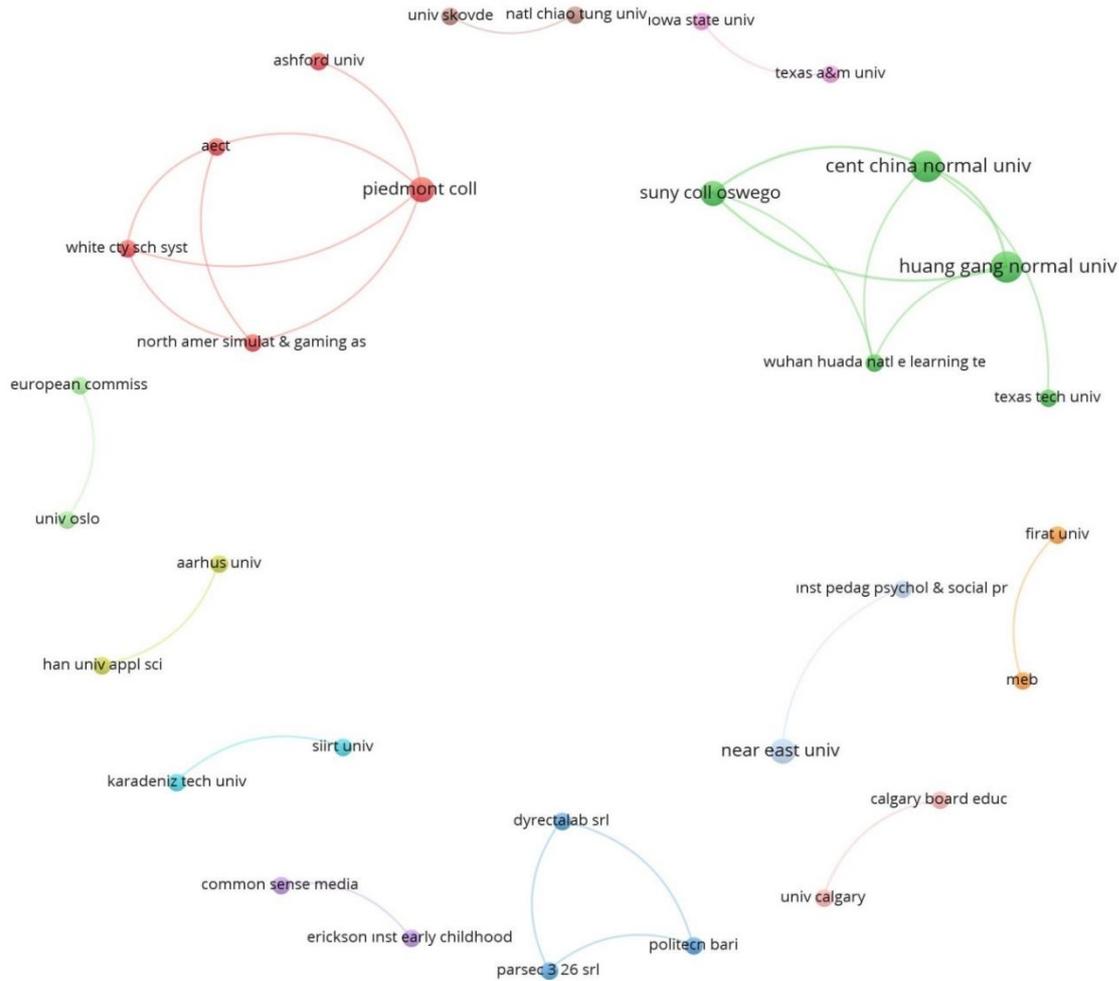
**Table 5.** Most cited institutions

Rank	Institution name	Number citations	of Number articles	of Mean citation
1	Ohio State University	137	3	45.66
2	Piedmont College	48	2	24
3	Iowa State University	40	1	40
4	Texas A&M University	40	1	40
5	University of North Carolina at Charlotte	39	2	19.5
6	University of Edinburgh	39	1	39
7	Association for Educational Communications and Technology (AECT)	38	1	38
8	North American Simulation & Gaming Association	38	1	38
9	White County School	38	1	38
10	University Granada	33	1	38

As can be seen in Table 5, “Ohio State University” ranks first as the most effective institution with 137 citations. The same institution stands out as the most productive and effective institution related to the relevant subject in terms of the number of publications and citations. The difference in the number of citations between this institution and other institutions is remarkable. In other words, the number of citations of other institutions is close to each other. The second institution with the highest number of citations is “Piedmont College”. One of the striking findings of the study is that although the "Central China Normal University", "University of Almeria" and "Huang Gang Normal University" are among the institutions that have published the most on this subject (Figure 3), they are not among the most cited institutions.

#### *Co-Author Analysis (Institution)*

There are 57 institutions that have published on digital citizenship in the education and educational research category of the WoS database. By determining the criteria of having at least 2 publications, 31 institutions with cooperation among these 57 institutions were determined and the cooperation network between these institutions is presented in Figure 4.

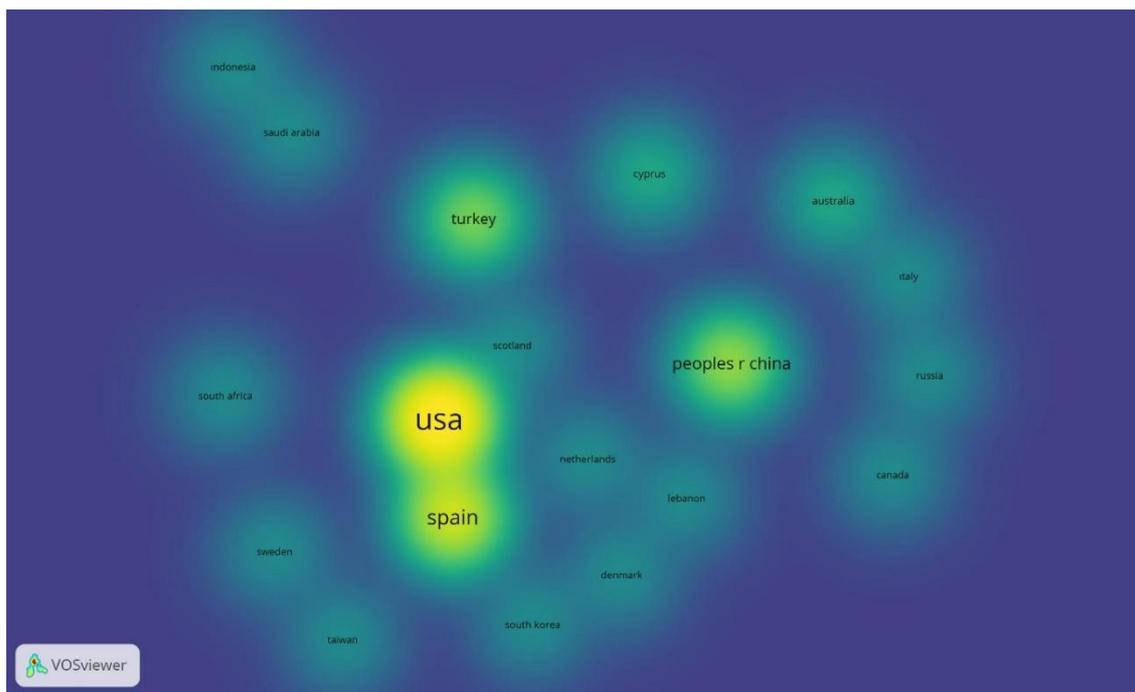


**Figure 4.** Inter-institutional cooperation network

There are clusters of different colors in Figure 4, where inter-institutional collaborations are located. The most intense collaborations are located in red, green, and blue clusters. While there is cooperation with five different institutions in the red and green cluster, there is a cooperation between three different institutions in the blue cluster." Piedmont College", "Central China Normal University", "Huang Gang Normal University" and "Suny College Oswego" stand out as institutions with strong cooperation.

*Countries with the most publications and citations about digital citizenship*

According to the information obtained from the WoS database, 23 countries that have published on digital citizenship in the category of education and educational research have been reached. The density map of the countries where studies on digital citizenship were made is presented in Figure 5.



**Figure 5.** Countries with the most publications on digital citizenship

As can be seen in Figure 5, the country with the most publications on digital citizenship is the USA (n:16). Followed by Spain (n:9), the People's Republic of China (n:6), and Turkey (n:5).

According to the information obtained from the WoS database, the information of the 10 most cited countries on digital citizenship in the education and educational research category is presented in Table 6.

**Table 6.** Most cited countries

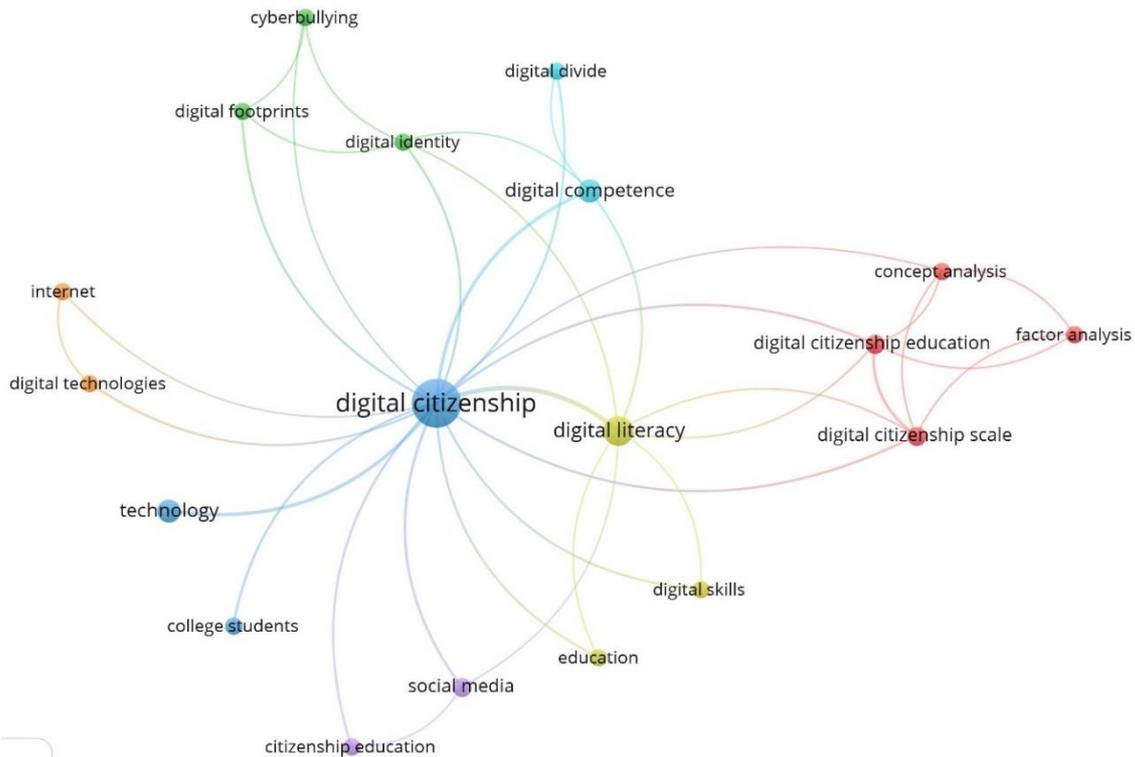
Rank	Country	Number of citations	Number of publications	Mean citation	Rank	Country	Number of citations	Number of publications	Mean citation
1	USA	322	16	20.12	6	Canada	28	1	28
2	Spain	82	9	9.11	7	South Korea	24	1	24
3	Scotland	39	1	39	8	Cyprus	15	2	7.5
4	People's Republic of China	38	6	6.33	9	Australia	11	2	5.5
5	Turkey	31	5	6.2	10	Denmark	11	1	11

As can be seen in Table 6, the USA is the most cited country with 322 citations. This country draws attention as the most productive and effective country in terms of the number of publications and citations. There is a dramatic difference between this country and the following countries in terms of citation performance. Other countries with high citations include Spain (n:82), Scotland (n:39), the People's Republic of China (n:38), and Turkey (n:31). Although Scotland has only one publication on digital citizenship, it stands out as the country with 39 citations and the highest mean citation performance. Likewise, the mean citation performance of Canada, South Korea, and Denmark seem to be high since they have

only one publication each.

*Author keyword analysis related to digital citizenship*

According to the information obtained from the WoS database, a total of 163 different author keywords belonging to the publications included in the study were reached. It was determined as a criterion that these keywords were used at least 2 times. As a result of this process, 19 different keywords were reached. The keyword network created as a result of the common keyword analysis on digital citizenship is presented in Figure 6.



**Figure 6.** Common keyword network

As can be seen in Figure 6, seven different clusters emerged in the keyword network most frequently used by authors on digital citizenship. The red cluster has 4 keywords, while the blue, green, and yellow cluster has 3 keywords each. In other clusters, there are 2 keywords each. The most commonly used author keywords are "digital citizenship", "digital literacy", "digital competence", "technology", "social media" and "internet".

*Author Co-Citation Analysis*

According to the information obtained from the WoS database, 1440 authors or sources (books, reports, etc. published by official institutions or NGOs) cited together in publications on digital citizenship in the category of education and educational research were reached. More than 5 citations were determined as criteria and 48 authors were reached. The author's co-citation network is presented in Figure 7.



According to information obtained from the WoS database, the publication titled “A concept analysis of digital citizenship for democratic citizenship education in the internet age” by Choi (2016) is the most cited publication on digital citizenship. The publication with the highest mean citation performance is the study titled “Towards a radical digital citizenship in digital education” by Emejulu and McGregor (2019). Another result of the study is about having the most publications on digital citizenship. According to this result, Choi, Moonsun; Lozano-Diaz, Antonia; and Xu, Shun are the most productive researchers. Richardson et al., (2021), while stating that there is no main author on the subject of digital citizenship, stated that the researchers with the most publications are Choi, Moonsun; Zhong, Lin; Martin, Florence, and McCosker, Anthony respectively. According to the results obtained from the WoS database, the most cited researcher is Choi, Moonsun. The same researcher is also at the top of the list of most productive researchers in terms of the number of publications. Choi, Moonsun is the most cited and most published researcher on digital citizenship. In other words, Choi, Moonsun is the most productive and effective researcher on digital citizenship. Other most cited researchers include Cristol, Dean, and Glassman, Michael. Fernández-Prados et al., (2020) found that Mossberger, Karen, and Tolbert, Caroline J., have the most published and cited researchers in all fields on digital citizenship. They determined that the researcher with the most publications and citations in the education category is Choi, Moonsun. The results of the mentioned studies are in line with the results of the current study. Taşkıran (2021) stated that the researchers who contributed the most to the field of digital citizenship were "Mossberger, K.", "Ribble, M.", "Choi, M." and "Jones, M."

According to the results obtained from the WoS database, Educational Technology & Society journal stands out as the journal that prints the most publications on digital citizenship. This journal can also be called the most productive journal related to the research topic. Computers & Education and TechTrends journals are other journals that publish a lot on digital citizenship. Richardson et al., (2021) found Educational Technology & Society, International Education Studies, and Computers & Education, respectively, to be the journals that published the most articles on digital citizenship. Educational Technology & Society is the most-cited journal on digital citizenship. This result of the study also coincides with the result mentioned above. According to the results obtained from the WoS database, the Educational Technology & Society is the most productive and effective journal on digital citizenship in the field of educational research. Other most effective journals on digital citizenship include Computers & Education, Theory and Research in Social Education, and TechTrends. In addition, Theory and Research in Social Education have the highest mean citation.

Another result of the study is related to the institutions that publish the most on digital citizenship. According to these results, Ohio State University, Central China Normal University, University of Almeria, and Huang Gang Normal University are the most productive institutions. According to the results obtained from the WoS database, the Ohio State University is the most cited institution. This result also coincides with the result that this institution is at the top of the list of the most productive institutions in terms of the number of publications on digital citizenship. Ohio State University has the most publications and citations on digital citizenship. In other words, Ohio State University is the most productive and effective institution for digital citizenship. There is a dramatic difference in the number of citations between Ohio State University and other institutions. The second institution with the highest number of citations is Piedmont College.

In the results of the study on inter-institutional cooperation, there are clusters with different cooperation networks. When the network density between the collaborating institutions was

examined, it was determined that in the network with the least density there are three institutions, while in the network with the most intense cooperation there are five institutions. In some cooperation networks, cooperation between local institutions is higher, while in some networks, international collaborations are more prominent. "Piedmont College", "Central China Normal University", "Huang Gang Normal University" and "Sunny College Oswego" stand out as institutions with strong cooperation.

Another result of the study is related to the countries that publish the most on digital citizenship. According to the results, the USA is the country with the most publications on digital citizenship. This situation can also be expressed as the USA is the most productive country on digital citizenship publications. Other countries with the highest number of publications on digital citizenship are Spain, the People's Republic of China, and Turkey. Fernández-Prados et al., (2020) found similar results in their studies. The USA stands out as the country with the most publications and citations, while Spain ranks second. One of the remarkable results of the study is that Spain ranks second despite having a smaller population and a less developed research tradition. According to the results obtained from the WoS database, the USA is the most cited country. This situation coincides with the result that the relevant country ranks first among the countries with the highest number of publications. The USA is the country with the highest number of publications and citations on digital citizenship. In other words, the USA is the most productive and effective country for digital citizenship. There is a significant difference between the USA and the other countries in terms of the number of citations. Other most cited countries are Spain, Scotland, the People's Republic of China, and Turkey. Scotland is the country with the highest mean citation performance despite having only one publication. These results coincide with the findings of the study conducted by Richardson et al., (2021).

It was determined that the most commonly used author keywords were "digital citizenship", "digital literacy", "digital competence", "technology", "social media" and "internet". Fernández-Prados et al., (2020) analyzed the most used keywords by excluding the keywords "digital citizenship" and "citizenship". They concluded that the internet, social media, digital literacy, and education were the most used keywords between 1989 and 2019. Taşkıran (2021) determined that digital citizenship, digital literature, technology, digital division, citizenship, internet, digital media, education, social media, and digital citizenship education were the most used keywords. The results of the keyword analysis in previous studies show parallelism with the results of the current study.

## **Limitations and Recommendations**

In this study, a scan was performed using the keyword digital citizenship. In future studies, it is possible to scan using similar keywords such as online citizen, e-citizen/ecitizen, electronic citizen, and netcitizen. In addition, as another limitation of the study, only the studies that included digital citizenship in the author keywords were included in the study. In future studies, study titles and abstracts may also be included in the scan. This study is limited to publications indexed in the WoS database. Using the criteria used in the data collection process of this study, the publications indexed in other databases can also be examined.

## **Conflict of Interest**

The authors declare that this study was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.



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