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Online Learning in Civic Education Research Trend: A Bibliometric Analysis

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Abstract

Online learning in civic education (OLCE) has been going on since the 2000s. It has become an increasingly interesting topic in light of recent technological advances and emergencies, and it contributes to improving the quality of learning processes and outcomes. This study aimed to track the publication trends of OLCE in the Scopus database (2005–2024). The method used was bibliometric, with VOSviewer software analysis. The investigation found 123 documents, half of which were articles, and the rest distributed among conference papers, book chapters, conference reviews, books, and notes. These publications were written by 320 authors from 39 different countries and used nearly 800 keywords. The number of OLCE publications increased significantly in 2021 and reached its highest peak in 2024. VOSviewer analysis showed that civic education was connected to the keywords "online learning" and "e-learning" in the case of large nodes and close distances. However, other strategic keywords, such as "MOOC," "digital citizenship," "artificial intelligence," and "social media" were detected in small nodes and far distances. The keyword "global citizenship education" was not directly connected; even "ChatGPT," the most influential OpenAI today, was not seen at all. This could mean that the development of several strategic keywords would make for a potential research study in future. This research provides new insights for researchers and institutions involved in OLCE publication mapping for future development.

Keywords: online learning, civic education, OLCE, citizenship education, bibliometric analysis

Online Learning in Civic Education Research Trend: A Bibliometric Analysis

Online learning is an increasingly popular learning delivery method. Its implementation may be not only due to technological advances but can also be triggered by emergency situations, such as the COVID-19 pandemic (Chai & Ye, 2024; Ganguli et al., 2024; Khan & Khan, 2024), which force restrictions on direct physical interaction. In fact, experts have predicted that online learning will continue to be the primary learning approach after the pandemic for reasons of flexibility and efficiency (Guo et al., 2024; Lv, 2024; Zhao et al., 2023), as is the case in the field of civic education. Studies have shown that online learning in civic education (OLCE) increases citizen engagement in political dialogue and public issues (King et al., 2021; Perla et al., 2022).

In observing various publication reports, numerous studies have also revealed weaknesses in online learning, such as lack of interaction quality, dependence on digital use, and eye health disorders (Baber, 2022; Bou Ghannam et al., 2024; Mohammed et al., 2024). As a field with qualitative material substance, OLCE certainly presents a challenge for teachers to focus the attention and participation of students with network-based instruments. Therefore, teachers need to innovate in designing OLCE to minimize these weaknesses, integrating games and various exciting learning models for example (Chin & Chen, 2023).

Among the studies on OLCE, Tadlaoui-Brahmi et al. (2022) linked the term *digital citizenship* to technology-based learning tasks and student engagement. Other studies, such as Gleason and von Gillern (2018), discussed how digital media applications can support citizenship education in middle and high schools to increase student activity and engagement in learning. Choi (2016), Choi et al. (2018), and Bal and Akcil (2024) explained the conception of democratic digital citizenship and how teachers educate their students to become responsible digital citizens, the level of efficiency of the digital citizenship curriculum, self-evaluation, and student opinions about the digital citizenship courses implemented.

Mapping of OLCE research is essential in efforts to develop OLCE in the future. In the Scopus database, only one study was found that mapped citizenship education research in general from 1975 to 2020 (Bozkurt et al., 2021). However, its focus did not include online learning, thus failing to address the need to understand publication trends specifically in this area. Our study aimed to track bibliographic metadata in OLCE to find research trends (documents, sources, authors, and other points). In addition to filling the research gap, this study provides new insights for researchers and institutions regarding OLCE.

Conceptual Framework of the Study

Online Learning

The migration from face-to-face to online learning during the COVID-19 pandemic posed significant challenges (Alshaboul et al., 2024; Caliph & Lee, 2024; Tesfay Gebremariam, 2024), including limited face-to-face interactions, which can reduce student engagement in learning (Baber, 2022; Shankar & Robinson, 2024). Reliance on adequate technology networks and infrastructure was a constraint in many regions,

especially in less developed areas (Mohammed et al., 2024; Yu, 2024). In addition, the adoption of more sophisticated technologies, such as blockchain, hyper spectroscopy, AI predictive models, and fuzzy systems (Bou Ghannam et al., 2024; Yan et al., 2024), although promising increased security and efficiency, also brings challenges in terms of scalability and complexity of implementation (Zhao et al., 2023), which has an impact on the risk of anxiety in learning activities (Bono et al., 2024; Peng et al., 2024), as well as increasing dropout rates (Aldowah et al., 2020).

On the other hand, various studies have revealed that there are innovations in online learning to help overcome these challenges. For example, using digital mind maps has been proven to increase student engagement and understanding, although its effectiveness still requires further research (Alsuraihi, 2022). Other approaches, such as auction-based client selection in federated learning, have shown an increase in efficiency and reduced training time while maintaining user privacy (Guo et al., 2024). In addition, using mobile devices makes access to education broader and more flexible (Al-Adwan et al., 2018). The online technology instruments used not only increase student engagement but also make the teaching and learning process more interactive, engaging, efficient, and successful in learning (Chonraksuk & Boonlue, 2024; Kristiana et al., 2023; Xue et al., 2024). Furthermore, students' inclination towards Information and Communication Technology (ICT) and web-centric devices creates excellent opportunities for online learning (Czerkawski, 2016; Tseng et al., 2023). Learning in the online context can improve students' learning culture, communication skills, satisfaction, and learning responsibility (Demirelli & Karaçay, 2024). These innovations reflect ongoing efforts to optimize online learning to be more effective and inclusive.

The future of online learning demands further research and development. Various studies recommend several inputs, such as increasing awareness of digital use, especially in reducing the negative impacts of prolonged use of digital devices, including eye health problems (Bou Ghannam et al., 2024). In addition, improving the quality of interaction and services in online learning platforms to reduce technical problems is essential to improving students' academic performance (Mohammed et al., 2024; Peng et al., 2024). With a more creative and innovative approach, online learning has great potential to continue to grow and provide more comprehensive benefits to the field of education in the future (Shankar & Robinson, 2024).

Civic Education

The International Civic and Citizenship Education (ICCS) reports in 2016 and 2022 identified sustainability, social systems, diversity, civic identity, civic engagement, and global citizenship as strategic global issues that must be systematically integrated into school curricula and civic education programs to foster a peaceful, balanced, and effectively functioning global society (Carstens & Schulz, 2018; Schulz et al., 2023). As an essential component of the global education curriculum, civic education is becoming increasingly important in order to broaden students' horizons not only in the national context but also in the global context (Bosio, 2024; Ghebru & Lloyd, 2020; Ghosn-Chelala, 2020; Meng, 2024; Schulz et al., 2023; Silva & Lourenço, 2023).

The delivery of civic education has evolved into a networked system called online learning in civic education (OLCE). OLCE has proliferated to the extent that it has attracted the attention of the academic world, driven by technological developments, the need for flexible learning, and emergencies such as COVID-19 (Chai &

Ye, 2024; Ganguli et al., 2024; Khan & Khan, 2024). However, even before the COVID-19 pandemic, the UK had developed, piloted, and evaluated a freely accessible Web-based civic learning activity that aimed to teach students about current academic debates on civics (Smith et al., 2008).

Various researchers have agreed on the definition of OLCE as learning that uses digital technology to teach civics concepts, moral values, and the sociopolitical skills essential to become active, critical, and responsible citizens (Winarno et al., 2023). This pattern of education is essential because it allows the wide dissemination of information and more equitable access, especially in the era of globalization, where understanding educational and global issues is increasingly important (Akkari & Maleq, 2020; Bosio, 2024; Harshman, 2018; Meng, 2024; Saada, 2023). Online civic education has guaranteed greater flexibility for students to study according to their schedules, thus increasing participation and engagement in the educational process (Cole et al., 2014; Demirelli & Karaçay, 2024; King et al., 2021).

Tools used in OLCE vary widely, including digital platforms, media, and algorithm analysis tools designed to support more adaptive and interactive learning (Choi et al., 2018; Hunt, 2023; Trisiana & Utami, 2022). Using AI and neural network-based platforms enables efficient student data management and supports personalization of the learning process (Cui, 2024b). In addition, digital media is used to increase student engagement in more critical and reflective discussions of politics and global issues and support adaptive and interactive learning (Bosio, 2024). Another practice, the use of massive open online courses (MOOCs) in civic education, can be used to bring together people who hold different political views through online forums and be an effective tool to increase citizen participation in political discussions (Sharov et al., 2023; Yeomans et al., 2018). Furthermore, the use of Internet media in civic parliaments can also encourage active citizen participation in social and political discussions despite challenges in technology access and participant engagement (Naval & Arbués, 2015). In addition, using neural network algorithms and artificial intelligence (AI) has become essential in personalizing learning. It improves the efficiency of civic education (Lv, 2024).

Various studies have revealed the advantages of OLCE, including flexibility in implementation, which allows students to access learning materials anytime and from anywhere (Al-Adwan et al., 2018; Cole et al., 2014; Demirelli & Karaçay, 2024; Shankar & Robinson, 2024), thus increasing their engagement in the learning process (Jing, 2024; Komalasari et al., 2024; Lv, 2024; Mahadir et al., 2021). A project-based learning model, using digital technology to strengthen the character of the foundational philosophical theory of Indonesia, Pancasila, by integrating life values in a digital context, suggested that civic learning can be used to build students' character effectively through an approach appropriate to the digital era (Komalasari et al., 2024). In line with that, OLCE in blended learning dramatically improves the learning process and supports democratic and sustainable civic education (Ovcharuk et al., 2020; Putri et al., 2020).

Recent research has also uncovered disadvantages of OLCE, such as risks to data privacy and overreliance on technology, which, if not properly managed, can hinder the learning process (Mohammed et al., 2024). In addition, the potential for greater political polarization, the challenges of maintaining consistent student engagement in online learning environments, and the risk of spreading misinformation through digital media are severe concerns in OLCE (Cui, 2024a; Meng, 2024). Digital technology must be recognized as having great potential, although it needs to be managed well; otherwise, it is feared it will strengthen social

inequality and mobilize sectarianism (Jackson, 2019).

Developing policies that support data protection, ethical use of technology, expansion of technology training, and more interactive and student-centered pedagogical approaches are the challenges for researchers and institutions to maximize the benefits of online civic education and overcome its drawbacks (Guo et al., 2024). These efforts are important to ensure that OLCE can continue to contribute to the strengthening of democracy and the formation of a more just and inclusive society in future (Bosio, 2024; Cui, 2024b).

Method

This research used the VOSviewer-assisted bibliometric analysis method. This type of analysis is conducted to understand the evolution, trends, status of scientific publications, and current research in a field (Avecilla et al., 2024; Ayaviri-Nina et al., 2023; Orbe et al., 2024; Rodriguez-Ulcuango et al., 2023), as well as to examine large data sets across sciences, disciplines, and topics (Donthu et al., 2021). The research analyzed in this study was scientific publications on online learning in civic education on the Scopus database, published 2005–2024 (Per August). The selection of the Scopus database took into account that Scopus is capable of analyzing scientific research in a quality and comprehensive manner, covering more international journals and resources, and having an automatic internal descriptive metrication and visualization system (Aksnes & Sivertsen, 2019; Blegur et al., 2024; Livia et al., 2021).

Data Collection

Data collection was conducted on August 12, 2024, using the main keywords “online learning” and “civic education” and several synonyms on the Scopus database with search queries, namely: TITLE-ABS-KEY (“online learning” OR “online teaching” OR “e-learning” OR “elearning” OR “virtual learning” OR “virtual teaching” OR “online pedagogy” OR “online course” OR “internet learning” OR “digital learning” OR “digital teaching” OR “digital pedagogy” OR “digital course” OR “distance learning” OR “distance course” OR “internet course” OR “internet-based learning” OR “web-based learning” OR “online-based learning” OR “digital-based learning” OR “distance-based learning”) AND TITLE-ABS-KEY (“civic education” OR “civic learning” OR “citizenship education” OR “citizenship learning” OR “civic course” OR “citizenship course”). As a result, 123 documents were found, and all identified publications were determined to be without exception.

Data Analysis

Bibliometric analysis is a rigorous data analysis procedure for exploring and analyzing large amounts of scientific data through various open-source software packages (Bozkurt et al., 2021; Donthu et al., 2021) to observe and interpret the current state of research, including the evolution of progress and trends of scientific publications on a topic (Avecilla et al., 2024; Orbe et al., 2024; Rashid et al., 2024). Using VOSviewer software, we were able to produce bibliographic maps of most of the data related to the distribution of publications per year, document type, subject area type, source type, author, author country, and most cited publications (Ge et al., 2023), which were visualized in the form of data network and cluster displays (Zhao et al., 2023). For general bibliographic data metrication of publications (year of publication,

number of documents, citations, etc.), we used the Publish or Perish software (Version 8.15.4710.9036; https://harzing.com/resources/publish-or-perish/). See Table 1.

Table 1

General Bibliographic Data From Selected Publications, 2005 until August 12, 2024

Data category	***n***
Citation years	19
Papers	123
Citations	497
Cites/year	26.26
Cites/paper	4.04
Cites/author	180.26
Papers/author	68.06
Authors/Paper	2.47
h-index	11
g-index	20
hI,norm	6
hI,annual	0.32
hA-index	5

Findings

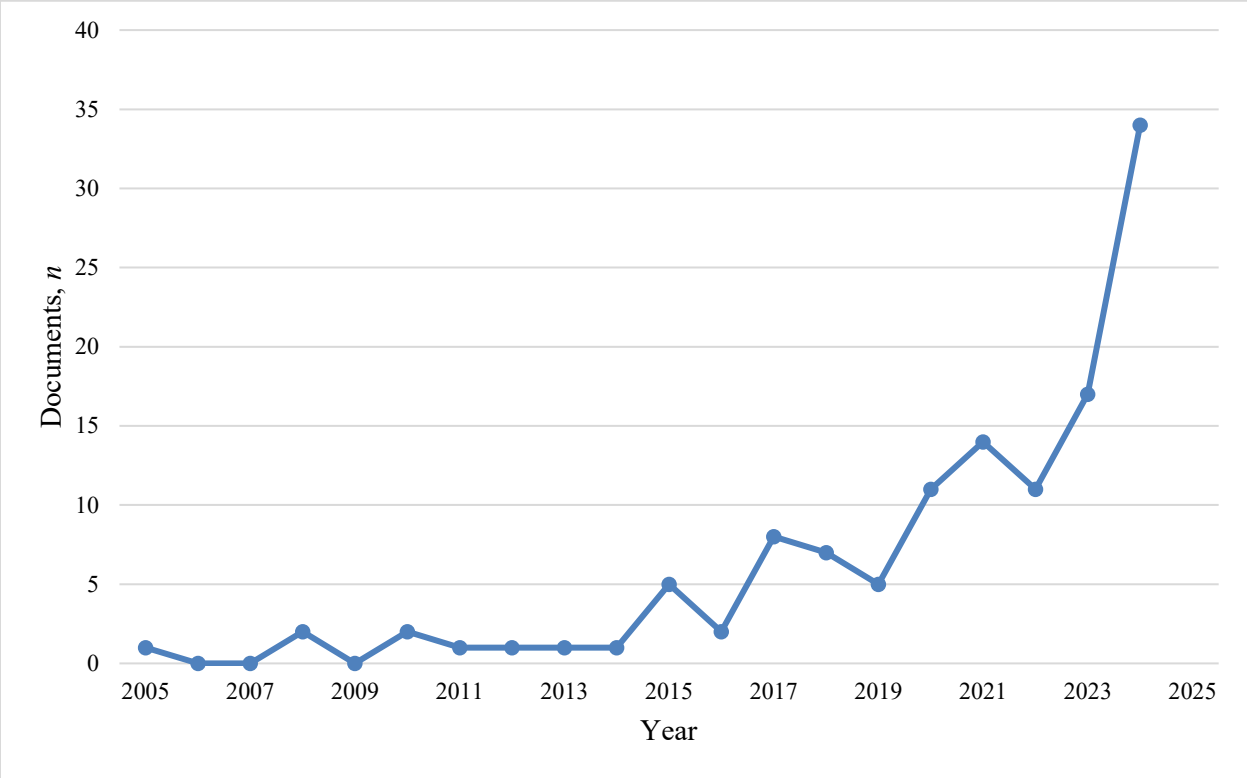
This section presents the results obtained from the analysis and synthesis of information carried out using the VOSviewer software.

Documents by Year

A search of publications in the Scopus database from 2005 until August 12, 2024, found 123 documents, including articles, books, and so forth, shown distributed by year in Figure 1. The distribution has fluctuated and tended to increase gradually since 2014. The highest number of publications occurred in 2024. From 2005 to 2014, the number of publications per year was relatively low, and in fact, in 2006, 2007, and 2009, there were no publications on OLCE. From 2019 to 2024, two peak points are essential to note: 2021 and 2024.

Figure 1

Number of Documents Analyzed in the OLCE Study by Year



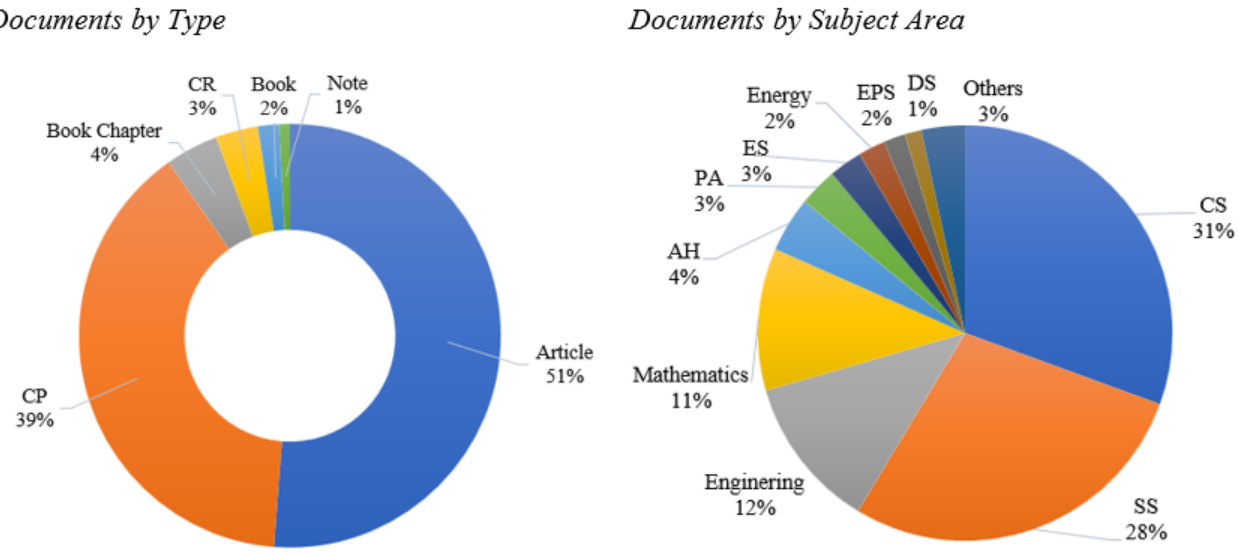
Documents by Type and Subject Area

Publications over the past 19 years have included various document types and subject areas. Document types, as shown in Figure 2, were distributed in six forms, with the most significant being articles, followed by conference papers, then book chapters, followed by conference reviews, books, and notes.

Simultaneously, Figure 2 shows the subject areas, which were spread across a range of disciplines. The highest proportion was in computer science, representing close to one third of subject areas, followed by social science, engineering, and mathematics. Together, these four subject areas represented about 80% of all subject areas in the study.

Figure 2

Documents in the OLCE Study Classified by Type and Subject Area



Note. N = 123; CP = conference paper; CR = conference review; CS = computer science; SC = social science; AH = art and humanities; PA = pysics and astronomy; ES = environmental science; EPS = earth and planetary science; DS = decision sciences.

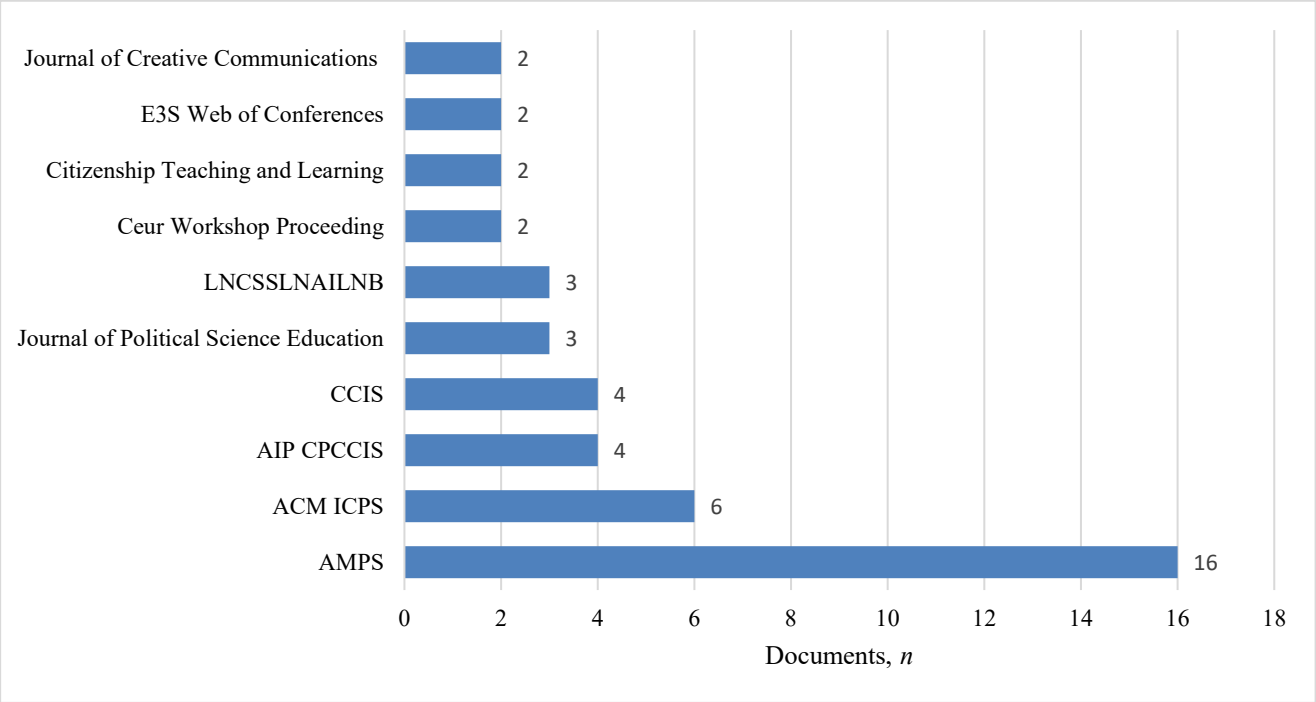
Documents by Source

Between 2005 and 2024 (Per August), numerous sources published on OLCE. Fifty-three sources were found, including both articles with regular submission processes and conference proceedings. Figure 3 shows the top 10 sources based on number of documents. The journal *Applied Mathematics and Nonlinear Sciences* published 16 documents, the most of any of the identified sources. It was followed by *ACM International Conference Proceeding Series*, *AIP Conference Proceedings*, and *Communications in Computer and Information Science*.

Applied Mathematics and Nonlinear Sciences is a journal affiliated with the publisher Walter de Gruyter based in Berlin, Germany, with a research scope in mathematics and related applications in physics, engineering, chemistry, economics, and social sciences. Given the number of OLCE articles published, the journal has significantly impacted the field. As a cautionary note, although *Applied Mathematics and Nonlinear Sciences* was the most productive journal, the most cited source was found in the journal *Computers and Education*, published by Elsevier: Choi et al. (2017), which presents a digital citizenship scale, has received 124 citations.

Figure 3

Top Ten Sources of Documents Analyzed in the OLCE Study



Note. AMPS = applied mathematics and nonliniear sciences; ACM ICPS = association for computing-machinery international conference proceeding series; AIP CPCCIS = american institute of physics-conference proceedings, and communications in computer and information science; CCIS = communication in computer and information science; LNCSSLNAILNB = lecture notes in computer science including subseries lecture notes in artificial intelligence and lecture notes in bioinformatics.

Next, the *ACM International Conference Proceedings Series* published by the United States-based Association for Computing Machinery (ACM) is the largest source of publications in the conference proceedings category (and the second largest overall), with a focus on publishing conference content, technical symposia, and workshops through electronic channels, specifically the ACM Digital Library, thereby increasing ACM's visibility in the international computing community. Of the six publications from this source, Richardson et al. (2017) has received the highest number of citations (n = 10). That research concerns the use of technology to support outdoor civic learning. Considering this data, it can be stated that ACM-published proceedings also significantly impact the field. As an important note, the conference proceedings source with the highest number of citations is the *Journal of Physics: Conference Series* (n = 35), specifically a paper by Sarosa et al. (2019) that explores teaching citizenship to children using augmented reality.

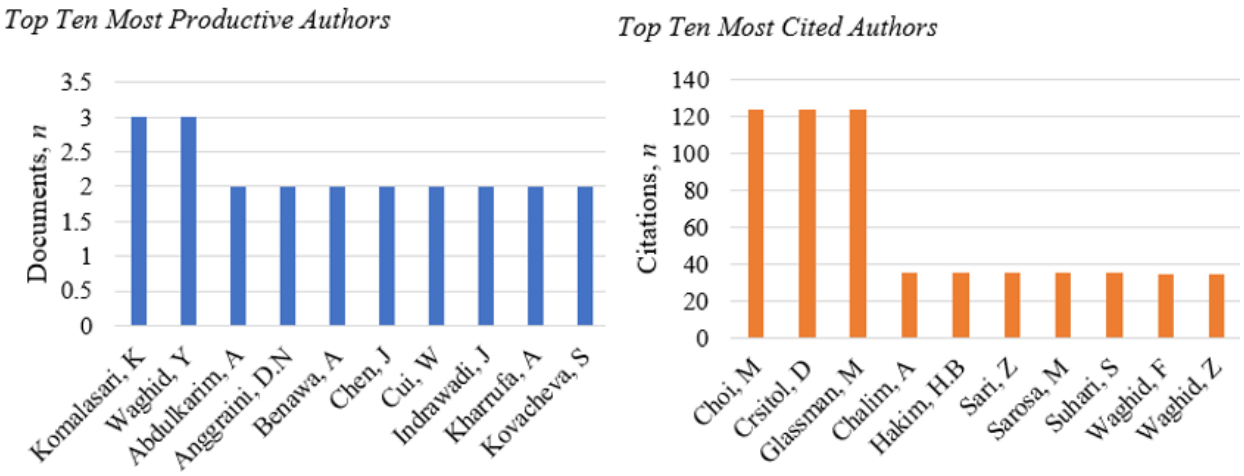
Distribution of Most Productive and Cited Authors in Publications

We identified the 10 most productive and cited authors. Figure 4 shows the 10 authors with the most publications and the 10 with the most citations. Komalasari and Waghid are the authors with the most

publications (n = 3 each), followed by Abdulkarim, Anggraini, Benawa, Chen, Cui, Indrawadi, Kharrufa, and Kovacheva with n = 2 each. The number of publications is relatively stable, with an average publication of 2 documents. At the same time, the diagram also shows the authors with the most citations. The number of citations from the 10 authors shows a dramatic difference between the first three authors, namely Choi, Cristol, and Glassman, who received 124 citations. The other seven authors with the most citations are Chalim, Hakim, Sari, Sarosa, and Suhari, with 35 citations each, followed by F. Waghid and Z. Waghid, with the same number of citations (n = 34).

Figure 4

Top Ten Most Productive and Cited Authors in the OLCE Study

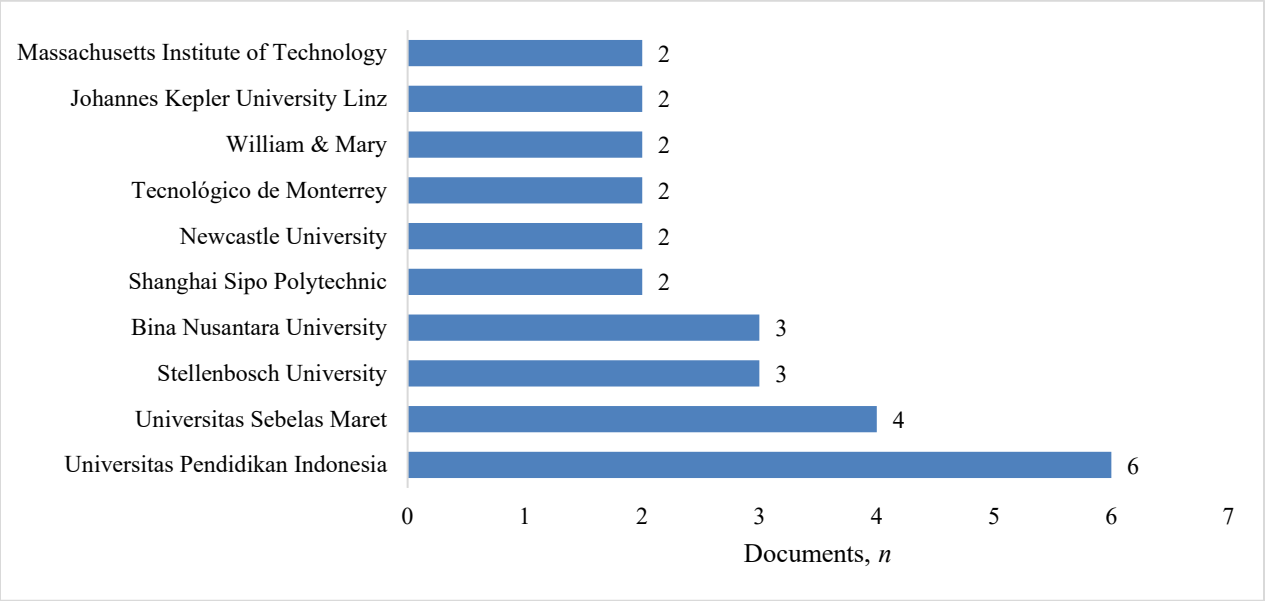


Documents by Affiliation

There are 10 author affiliations credited with the most publications, with a relatively stable trend. The ten affiliations with the most publications are shown in Figure 5, with Universitas Pendidikan Indonesia as the affiliation with the most publications (n = 6), followed by Universitas Sebelas Maret, and Stellenbosch University. The average number of publications of the 10 affiliations is 2.7, meaning that in the last 19 years, all affiliations have been relatively stable. It is important to note that Universitas Pendidikan Indonesia has a complete Civic Education Study Program at the undergraduate, master, and doctoral levels. Thus, OLCE would tend to be a central topic of study for researchers from that university, considering the massive use of digital-based devices and activities.

Figure 5

Number of Published Documents by Affiliation



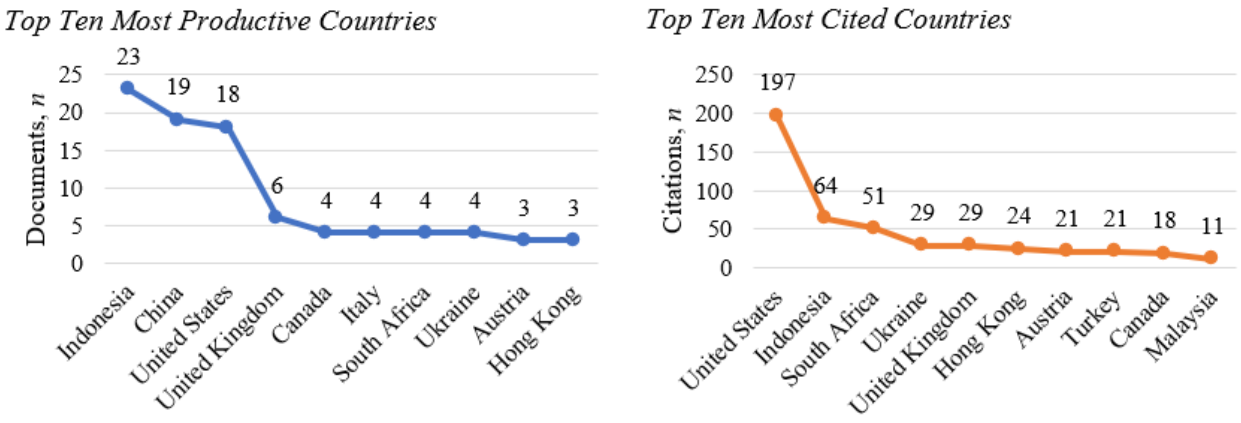
Documents by Country

The 10 countries with the most publications and citations concerning OLCE are also of interest in this study. These are shown in Figure 6, where there is a modest distribution in the category of countries with the highest number of publications. Indonesia has the highest number of publications (n = 23), followed by China and the United States. Seven countries averaged four publications each. This means that publications on OLCE are relatively stable in this category.

There is, however, a reasonably varied distribution of numbers in the countries with the most citations. The United States is in the first position (n = 197), followed by Indonesia and South Africa. Next are Ukraine, the United Kingdom, Hong Kong, Austria, and Turkey. Countries worldwide and almost all continents are represented, as shown in Figure 7.

Figure 6

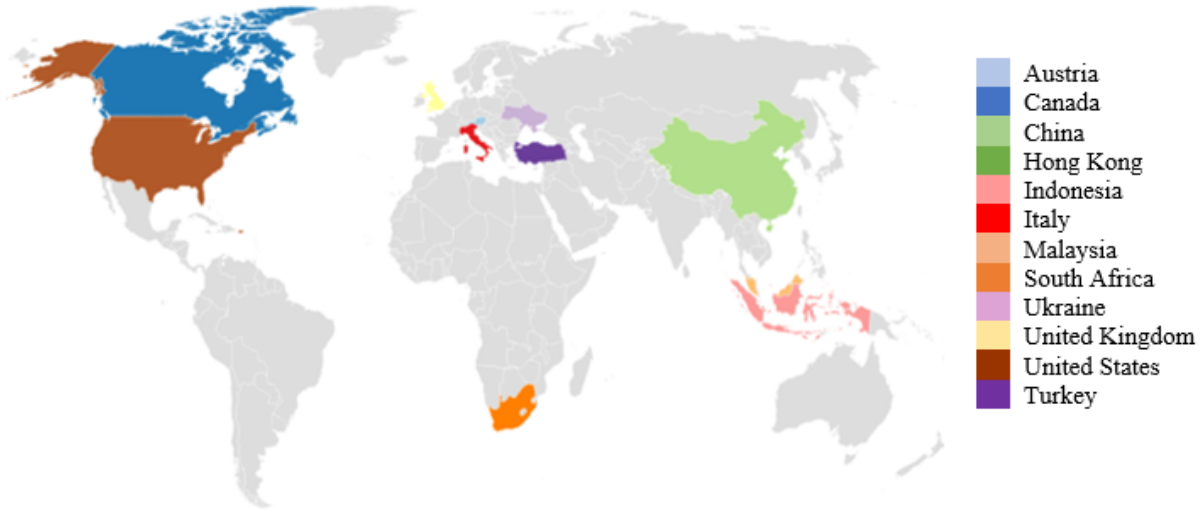
Top Ten Most Productive and Cited Countries in the OLCE Documents



In terms of continental representation, Asia and Europe dominated the publications on OLCE: Indonesia, China, Malaysia, Hong Kong, the United Kingdom, Italy, Ukraine, and Austria all had equal numbers (n = 4; countries in Asia and Europe dominate publications in the OLCE field with four publications each). They were followed by the America (n = 2) (two countries in america with 2 publications each), namely the United States and Canada, and South Africa from Africa. These findings illustrate that the topic of OLCE has become a study almost all over the world as an implication of technological advances and the emergency conditions during the COVID-19 pandemic.

Figure 7

Number of OLCE Documents and Citations by Country



Note. The map highlights the most productive and most cited countries in OLCE documents. The legend indicates the color representation for each country. Gray areas represent countries that are not part of the dataset.

Documents by Citation Number

Our analysis identified 10 publications with the highest number of citations. Table 2 shows these 10 publications, with a notably varied distribution of numbers. Choi et al. (2017) is in the first position with 124 citations, followed by Sarosa et al. (2019) and Waghid et al. (2018).

Table 2

OLCE Documents Ranked by Number of Citations

Rank	Authors	**Documents Title**	CT	FWCI	VC	CB
1	Choi et al. (2017)	"What it Means to Be a Citizen in the Internet Age: Development of a Reliable and Valid Digital Citizenship Scale"	124	4.83	169	97th
2	Sarosa et al. (2019)	"Developing Augmented Reality-Based Application for Character Education Using Unity with Vuforia SDK"	35	10.88	74	99th
3	Waghid et al. (2018)	"Rupturing African Philosophy on Teaching and Learning: Ubuntu Justice and Education"	34	3.28	18	94th
4	Brinker et al. (2015)	"Inspiring and Informing Citizens Online: A Media Richness Analysis of Varied Civic Education Modalities"	28	0.43	28	51th
5	Ovcharuk et al. (2020)	"The Use of Digital Learning Tools in the Teachers' Professional Activities to Ensure Sustainable Development and Democratization of Education in European Countries"	23	10.07	74	99th
6	Hyett et al. (2019)	"Trialing Virtual Intercultural Learning with Australian and Hong Kong Allied Health Students to Improve Cultural Competency"	21	1.76	54	84th
7	Reich et al. (2016)	"The Civic Mission of MOOCs: Measuring Engagement Across Political Differences in Forums"	21	4.20	38	96th
8	Akbulut et al.	"More Than a Virus: How COVID- 19	19	2.31	25	90th

	(2020)	Infected Education in Turkey?"				
9	Sonn et al. (2021)	"Achievements and Challenges for Higher Education During the COVID-19 Pandemic: A Rapid Review of Media in Africa"	15	1.18	33	76th
10	Huish (2021)	"Global Citizenship Amid COVID-19: Why Climate Change and a Pandemic Spell the End of International Experiential Learning"	12	1.20	57	76th

Note. CT = citation total; FWCI = field-weighted citation impact; VC = views count; CB = citation benchmarking.

Co-Occurrence (Keywords) Trends

Our analysis found keywords using the category of frequent occurrence. It was carried out through co-occurrence analysis on all units of analysis, with the full counting method and the criterion of at least three keywords appearing together from five default models. The analysis results show 56 keywords that meet the threshold out of 794 keywords. Table 3 shows examples of the keywords, categorized in five clusters. Figure 8 is a visualization of the relationships between the keywords. It shows 470 links and 997 total link strength. Link strength indicates the strength of the relationship between keywords based on the frequency of their co-occurrence in the analyzed documents, where the higher the link strength value, the stronger the conceptual relationship between the keywords in bibliometric analysis.

Table 3

Clusters of Keywords by Co-Occurrence in the OLCE Documents

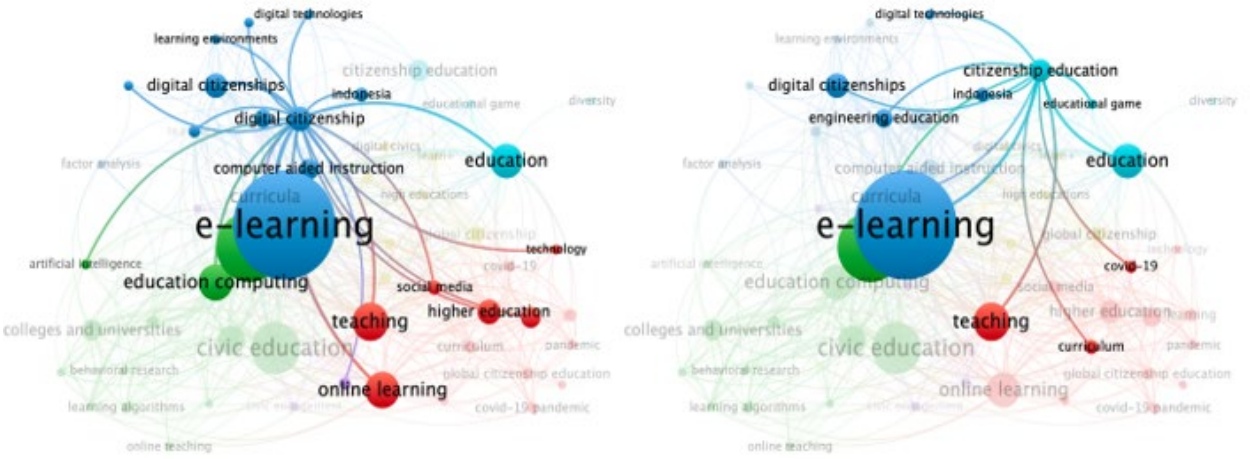
Cluster	Color	Sample keywords	Items, ***n***
1	Red	Artificial intelligence, behavioral research, big data, civic education, colleges and universities, education computing, ideological and political education, learning behavior, learning systems, online teaching	21
2	Green	Citizenship, COVID-19, curriculum, data analysis, global citizenship education, higher education, learning, online learning, social media, technology	15
3	Blue	Computer-aided instruction, digital citizenship, digital citizenship education, digital citizenships, digital technologies, engineering education, factor analysis, learning environments, sustainable development, teachers	10
4	Yellow	Citizenship education, civic learning, digital civics, diversity, education, education game, learn+	7
5	Magenta	Civic engagement, MOOC, surveys	3

Note. Red represents a cluster of keywords that are strongly interconnected, indicating a major thematic area with high co-occurrence frequency; Green represents a distinct but related thematic group, often signifying a secondary or emerging research focus; Blue indicates another key cluster, often reflecting a complementary or alternative research direction within the broader topic; Yellow represents a smaller or more specialized thematic grouping, often connected to interdisciplinary or niche topics; Magenta denotes a minor yet relevant cluster, typically associated with specific case studies, recent trends, or exploratory research directions.

The dominant main themes, significant supporting themes, and several specific sub-themes shown in Table 3 form a map of research trends in OLCE. This reflects the complexity and depth of this field of study and shows that the topic is broad and rich with multiple perspectives and approaches. Unfortunately, from the networking that has been established, OLCE has yet to be optimized for assessment purposes, be it self-assessment or peer assessment. This could be a topic for future research.

Figure 8

Visualization Co-occurrence (Keywords) Analysis



Note. The color grouping in this visualization aims to make it easier to read, indicating that the redder the color, the more terms are discussed in the document, while the bluer the color, the fewer terms are discussed in the document.

Our analysis identified these 10 keywords which occurred most often among the research documents: e-learning, students, civic education, teaching, educational computing, online learning, education, learning system, curriculum, and higher education. . Furthermore, the overlay visualization showed that in the range of 2018 to 2024, there are keywords in yellow nodes, namely colleges and universities, learning algorithms, behavioral research, learning behavior, ideological and political education, big data, k-means clustering, learn+, and higher education. Researchers widely used some of these keywords in OLCE studies in 2024.

Title and Abstract Trends

We enriched the visualization analysis on the title and abstract term trends, using the field to extract the term in the title and reducing the field with the full counting method. The minimum number of occurrences

of a keyword was set at five from the default model of 10, thus forming 231 that meet the threshold of 3,294 terms. In the chosen number of terms display, the default option was to select 60% of the most relevant terms; the number of terms selected then was 139. This resulted in five clusters, 2,932 links, and 13,860 total link strength (See Table 4)

Table 4

Clusters of Keywords by Title and Abstract in the OLCE Documents

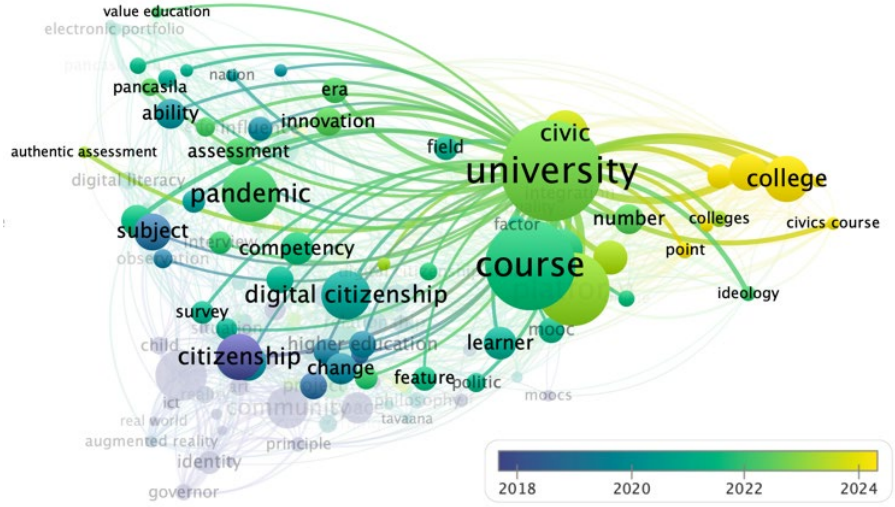
Cluster	Color	Sample terms	Items, ***n***
1	Red	Augmented reality, character education, citizenship, community, digital competency, digital environment, digital resource, digital technology	40
2	Green	Civic knowledge, civic learning, global citizenship, global citizenship education, higher education, higher education students, massive open online course, MOOCs, online teaching	37
3	Blue	Assessment, authentic assessment, citizenship learning, digital learning environment, digital literacy, electronic portfolio, Pancasila education, pandemic, self assessment, value education	30
4	Yellow	Behavior, big data technology, civics course, college student, ideology, integration, online course, political education, resource	21
5	Magenta	Course, creation, digital citizenship education, digital citizenship skills, focus, individual, learner, MOOC, quality, undergraduate students	11

Note. Red represents a cluster of keywords that are strongly interconnected, indicating a major thematic area with high co-occurrence frequency; Green represents a distinct but related thematic group, often signifying a secondary or emerging research focus; Blue indicates another key cluster, often reflecting a complementary or alternative research direction within the broader topic; Yellow represents a smaller or more specialized thematic grouping, often connected to interdisciplinary or niche topics; Magenta denotes a minor yet relevant cluster, typically associated with specific case studies, recent trends, or exploratory research directions.

Table 4 also shows the clusters of terms and thus, the OLCE research trends. Once again, we highlight the term “assessment” in OLCE learning since assessment is both essential and complex. If teachers maximize technology to assess student learning outcomes and experiences, they can record and manage student learning data more safely and accurately. If we look at Table 4 and the visualization in Figure 9, assessment has appeared in the OLCE research trends. Unfortunately, terms related to assessment, such as “authentic assessment,” “assessment,” and “electronic portfolio” have formed a network with the term “university,” but when tracked using the term “digital citizenship,” there is no evidence of networking. This finding may indicate an opportunity for future exploration so that digital platforms are more directly and consistently linked to assessment-related activities.

Figure 9

Visualization Title and Abstract Analysis



Note. VOSviewer (https://www.vosviewer.com/).

In the title and abstract analysis, the 10 terms with the highest occurrence were: university, course, platform, pandemic, game, digital citizenship, college, civic, citizenship, and community.

Discussion

The limited number of bibliometric studies in citizenship education indicates the need for research mapping in this field, especially regarding OLCE. In the Scopus database, we found only one study which mapped research on citizenship education in general from 1975 to 2020 using bibliometric analysis (Bozkurt et al., 2021). However, that study did not address the aspect of online learning in citizenship education. This means that our study can fill the gap in previous research and provide a new perspective, emphasizing that investigating OLCE remains a future research need. It is not only the limited number of studies on OLCE, but also the need for more clinical investigations that we highlight. It is vital for strategic recommendations that apply to teachers who integrate technology in supporting decisions related to developing student learning outcomes in civic education.

The field of computer science is known to have the highest number of research publications (Sanz-Prieto et al., 2024; Vanitha & Alathur, 2023; Zhang, 2024), which reflects the importance of computers in supporting activities across life fields (Arsić & Milovanović, 2016), making computer science an appropriate area for further publication, including in the field of OLCE. The analysis also shows that research on OLCE can be studied from various perspectives, not limited to social science (El Massoudi, 2024; Mullen, 2021; Sriwisathiyakun & Dhamanitayakul, 2024), but also of particular interest in the fields of engineering (Sun, 2024), mathematics (Jing, 2024; Li, 2024), arts and humanities (Kovacheva & Dimitrova, 2017; Montessori

et al., 2024), physics and astronomy, environmental science (Occhioni et al., 2023), earth and planetary sciences (Occhioni et al., 2023; Sharov et al., 2023), business, management, and accounting (Cho et al., 2024; Liu & Ni, 2024), and medicine (Perla et al., 2022; Sonn et al., 2021).

It is worth noting that "Rupturing African philosophy on teaching and learning: Ubuntu justice and education" (Waghid et al., 2018) had the highest total link strength. In substance, this book explores African educational philosophy and the application of Ubuntu justice through a MOOC on teaching for change. The author argued that critical, reflective, and compassionate pedagogical interactions can promote just and democratic human relations and foster decolonization in African higher education settings. Concepts of justice, equality, and democracy are core substances of citizenship education (Blevins, 2022; Bringle & Clayton, 2023; Jaffee, 2022; Kennedy, 2019; Kim & Kwon, 2023; Quinn & Bauml, 2018).

In addition, Choi et al. (2017) was the article with the highest number of citations (n = 124). This publication focuses on developing a comprehensive Digital Citizenship Scale (DCS) to measure youth's abilities, perceptions, and participation levels in Internet-based communities. This study is certainly of public interest, given the importance of digital citizenship in the context of 21st-century citizenship education (Althibyani & Al-Zahrani, 2023). This publication's metrics showed a FWCI of 4.83 and a CB score of 97th, indicating that the article is highly influential in the OLCE research field, with a citation performance above average or more cited than expected. Sarosa et al. (2019) is also noteworthy, with only 35 citations but surpassing Choi et al. (2017) in both the FWBI (10.88) and CB score (99th) categories. It, too, has a massive influence on OLCE research.

Analysis of the co-occurrence of keywords confirms that there is a strong research trend on the topic of OLCE, as shown by the network of civic education keywords connected to strategic and diverse keywords such as online learning (red), virtual reality (yellow), e-learning (blue), digital citizenship (magenta), and MOOC (magenta), and in the green cluster, also connected to online teaching. Further research is needed, considering that in almost two decades (2005–2024), only 123 publications were found. The links between civic education and several strategic keywords are still quite far apart, with minor nodes, and include terms such as digital citizenship, artificial intelligence, MOOC, and social media. Some of these keywords are strategic in the current OLCE constellation (Mahadir et al., 2021; Waghid, 2021; Yeomans et al., 2018); the keyword "global citizenship education" as a movement to actualize civic education in an international context (Kenyon & Christoff, 2020; Silva & Lourenço, 2023) has not been directly connected to civic education research.

The term "ChatGPT," despite it being the most influential OpenAI for citizens' lives globally today (Chauncey & McKenna, 2023; Pursnani et al., 2023), has yet to appear in the network, indicating that there is still very little or no research about it and civic education. In addition, colleges and universities, learning algorithms, behavioral research, and several other terms appear in the overlay visualization, indicating that the latest research in 2024 on the topic of OLCE continues to be conducted from various perspectives, concentrated however at the higher education level (Cui, 2024b; Liu, 2024).

Conclusion and Implications

Co-occurrence analysis using all units of analysis found that the term "online learning" appeared 16 times. The word "e-learning" as a synonym for online learning appeared the most (n = 60), and the keyword "civic education" appeared 25 times. These three keywords have relatively large nodes with close distances, clearly visualized in the VOSviewer network. This proves that in the last 19 years, research on OLCE has been the concern of researchers, for example, Choi et al. (2017), Sarosa et al. (2019), Brinker et al. (2015), and Ovcharuk et al. (2020). However, further research is needed on several strategic keywords in the context of OLCE with relatively small nodes, such as massive open online courses (MOOCs), while other keywords are at a greater distance, such as digital citizenship, artificial intelligence, and social media. Even in the visualization, the keyword "global citizenship education" has not been directly connected to civic education, and the term "ChatGPT" has not appeared at all. This means that these terms have the potential to be applied in further research.

In addition to mapping publications on OLCE over the past 19 years, this study also makes essential contributions for researchers and institutions wishing to explore, innovate, and develop further understanding on the topic of OLCE. This study has some limitations arising from the nature of the bibliometric approach. For example, the research findings are based on only 123 publications from the Scopus database; publications from other databases were not included. In addition, the keywords in civic education were limited to civic education and citizenship education, so publications using social science keywords were not analyzed. We recommend that future research add other databases and social science keywords to obtain more comprehensive analysis results.

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