




Bibliometric Analysis: Civic Education E-Learning for Digital Civic Skill

Nisrina Nurul Insani^(✉) 

Universitas Pendidikan Indonesia, Bandung, Indonesia
nisrina.n.i@upi.edu

Abstract. This study is a bibliometric analysis of an indexed article in Google Scholar that discusses civic education e-learning for digital civic skills using the publish or perish reference application and VOSviewer. This bibliometric analysis aims to determine the development of research on the use of e-learning in civic education for digital civic skills. The search was carried out through the publish or perish reference application with keywords to guide the process of searching for research titles and abstracts, namely “e-learning, civic education, digital civic skills”. Research development data is limited in the last 10 years (2012–2022) on Google Scholar. The search results found 993 papers with 16457 citations deemed relevant. The highest number of citations occurred in 2018 as many as 2574 citations. In the publication trend, the most publications occurred in 2021 as many as 197 publications. The results of the analysis of the development of civic education e-learning for digital civic skills in the last 10 years show quite frequent fluctuations. In 2013–2014 it decreased from 61 articles in 2013 to 52 articles in 2014. Research fluctuations occurred from 2015–2019 (sequentially 60, 71, 76, 78, 91 publications per year). In 2020–2021 there will be an increase in research, from 130 studies (2020) to 197 studies (2021). In 2022 again declined with 116 studies. Data on the development of civic education e-learning studies for digital civic skills is visualized using VOSviewer.

Keywords: E-Learning · Civic Education · Digital Civic Skill

1 Introduction

Digital civic skills are needed by citizens to develop a generation that is insightful, critical and socially aware and responsible in a global and digital society [1]. Empowering young people to use technology in their community involvement to help close the digital gap and advance digital civic education is a significant aspect in the development of digital civic skills [2]. One method for enabling young people to use technology and build their digital citizenship skills is the use of e-learning in civic education. Civic education requires a touch of digital technology to help students identify issues that arise in social citizenship issues, including digital media. Finding and solving problems critically and actively participating in the life of the nation and state are important in creating smart and good citizens as the goal of civic education.

© The Author(s) 2023

D. Iswandi et al. (Eds.): ACEC 2022, ASSEHR 768, pp. 759–771, 2023.

https://doi.org/10.2991/978-2-38476-096-1_80

E-learning research is in great demand, especially in the fields of educational research and civic education. One of the analytical techniques that can show the development of research in the field of civics education e-learning is bibliometric analysis. By making sense of vast amounts of unstructured data in rigorous ways, bibliometric analysis is valuable for unraveling and charting the cumulative scientific knowledge and evolutionary subtleties of well-established domains. Therefore, well-executed bibliometric studies can lay solid foundations for advancing a field in new and significant ways by enabling and empowering scholars to (1) gain a comprehensive overview, (2) identify knowledge gaps, (3) generate original research questions, and (4) position their intended contributions to the field [3].

Research based on bibliometric analysis has developed a lot. There are several studies based on bibliometric analysis in various aspects including e- learning [4–6], education [7, 8], civic education [9–11], skill [12, 13], higher education [14, 15], mobile learning [16], teacher [17], lecturer [18], universities [19]. However, the research on computational mapping, bibliometric analysis, published on the development of data in the field of e-learning in civic education has not been carried out. Especially bibliometric analysis for the last 10 years in the period 2012 to 2022 using VOSviewer.

As a result, computational research was used to analyze article titles and abstracts linked to civic education and e-learning for the development of digital civic abilities. Google Scholar used the Publish or Perish program and VOSviewer to index the article data. This study was undertaken in the hopes that it would serve as a guide for future researchers choosing their research topics, particularly when it comes to civic education e-learning for digital civic skills.

2 Method

This study uses the Google Scholar database to test studies that discuss e- learning civic education for civic skills with bibliometric analysis. Google Scholar was chosen in this study because Google Scholar is open source. Bibliometric analysis is a method for exploring and analyzing large amounts of scientific data to uncover the evolutionary nuances of a particular field, while highlighting emerging areas in that field [3]. Bibliometrics is the mathematical and statistical analysis of the publication and use of documents. The data collection method in bibliometric analysis is done by checking each article and recording all information related to the article profile [20]. The research was conducted through several stages:

- 1) Using the publish or perish reference application, collect publication statistics;
- 2) Processing bibliometric information for articles received by Microsoft Excel programs,
- 3) Utilizing the VOSviewer tool, analyze computational mapping of bibliometric published data.
- 4) Evaluation of the outcomes of computational mapping.

The manager's reference application, referred to as publish or perish reference, was used to gather the study data. The study by Husaeni et al. [21] provides instructions on how to use and install software and outlines the step-by-step procedure for acquiring

Fig. 1. Bibliographic search in the publish or perish application

data, and a prior study by Azizah et al. [22] provides comprehensive instructions on how to use a library search to find data on Google Scholar.

The search was carried out in several aspects. First, the type of bibliography used in the type of journal article. The two keywords to guide the process of searching for research titles and abstracts are “e-learning, civic education, digital civic skills”. Third, the search year in this study was limited to the last 10 years, namely 2012–2022 (Fig. 1).

After that, the article data from the original database is mapped. Using VOSviewer, data mapping is performed. Large volumes of bibliometric data can be mapped with the aid of the tool VOSviewer. With the help of this program, bibliometric maps can be thoroughly viewed from a range of angles, each of which emphasizes a particular feature of the map. The zooming, scrolling, and searching features of VOSviewer make it easier to examine a map in detail [23]. Map bibliometric trends can be evaluated and seen using VOSviewer. Network visualization, density visualization, and overlay visualization based on the network between the items are the three types of publishing mapping that VOSviewer visualizes.

3 Result and Discussion

3.1 Publication Data Results

The findings from the analysis of Google Scholar data from publish or perish include 993 articles with 16457 relevant citations. Other information included citation data per year of 1645.70, citations per article of 16.57, average number of authors per article of 2.35, and average h-index and g-index for all articles of 62 and 96, respectively. The information was gathered in the form of article metadata, which included the author’s name, title, year, journal name, publisher, quantity of citations, connections to the paper, and associated URLs. Table 1 displays some sample information from the 20 top articles with the most citations.

3.2 Research Development in the Field of E-Learning Civic Education

In the publication trend, the most publications occurred in 2021 as many as 197 publications. The results of the analysis of the development of civic education e-learning for digital civic skills in the last 10 years show quite frequent fluctuations. In 2013–2014 it decreased from 61 articles in 2013 to 52 articles in 2014. Research fluctuations occurred from 2015–2019 (sequentially 60, 71, 76, 78, 91 publications per year). In 2020–2021 there will be an increase in research, from 130 studies (2020) to 197 studies (2021). In 2022 again declined with 116 studies. Table 2 shows the development of civic education e-learning research published in the Google Scholar indexed journal.

Table 1. Civic Education E-learning Publication Data

No	Authors	Title	Year	Cites	Refs
1	Manca et al.	Is it a tool suitable for learning? A critical review of the literature on Facebook as a technology-enhanced learning environment	2013	643	[24]
2	Chalkiadaki et al.	A systematic literature review of 21st century skills and competencies in primary education.	2018	314	[25]
3	Heggart, et al.	Getting the most from Google Classroom: A pedagogical framework for tertiary educators.	2018	289	[26]
4	Aruna, et al.	Employee retention enablers: Generation Y employees	2015	279	[27]
5	Korkmaz, et al.	Are we ready for the post-COVID-19 educational practice? An investigation into what educators think as to online learning.	2020	230	[28]
6	Al-Rahmi, et al.	A model of using social media for collaborative learning to enhance learners' performance on learning	2017	226	[29]
7	Sicat, et al.	Enhancing college students' proficiency in business writing via schoology	2015	215	[30]
8	Waldner et al.	E-service learning: The evolution of service-learning to engage a growing online student population	2012	207	[31]
9	Røkenes, et al.	Development of student teachers' digital competence in teacher education-A literature review	2014	196	[32]
10	Cinque	"Lost in translation". Soft skills development in European countries	2016	182	[33]
11	Huda, et al.	Understanding Modern Learning Environment (MLE) in Big Data Era.	2018	175	[34]

(continued)

Table 1. (continued)

No	Authors	Title	Year	Cites	Refs
12	Manca, M et al.	Is Facebook still a suitable technology- enhanced learning environment? An updated critical review of the literature from 2012 to 2015	2016	174	[35]
13	Hoq	E-Learning during the period of pandemic (COVID- 19) in the kingdom of Saudi Arabia: an empirical study	2020	164	[36]
14	Hopkins, et al.	To the point: medical education, technology, and the millennial learner	2018	157	[37]
15	Pérez- Rodríguez, et al.	From digital and audiovisual competence to media competence: Dimensions and indicators	2012	149	[38]
16	Alper	Developmentally appropriate new media literacies: Supporting cultural competencies and social skills in early childhood education	2013	142	[39]
17	Maseleno, et al.	Demystifying learning analytics in personalised learning	2018	142	[40]
18	Hockly	Digital literacies	2012	139	[41]
19	Karakas, et al.	Reorienting self- directed learning for the creative digital era	2012	127	[42]
20	Rosenblit	E-teaching in higher education: An essential prerequisite for e-learning	2018	118	[43]

Figure 2 shows the fluctuations in the development of civic education e-learning research in the last 10 years from 2012 to 2022. Based on Fig. 2, it is known that from 2016 to 2021 the publication of civic education e-learning research continues to increase. The peak of most publications occurred in 2021. Then it decreased again in 2022. Data recorded in 2022 started from January to September.

3.3 Visualization E-Learning Civic Education Topic Area Using Vosviewer

Computational mapping was carried out on article data using VOSviewer. The results of the computational mapping found 582 items, 13 clusters, 21188 links and a total link strength of 33625. Each item found was relevant to civic education e-learning. Item mapping is divided into 13 clusters, namely:

Table 2. Development of Civic Education E-learning research

YEAR OF PUBLICATION	NUMBER OF PUBLICATION
2012	47
2013	61
2014	52
2015	60
2016	71
2017	76
2018	78
2019	91
2020	130
2021	197
2022	116
Total	979
Average	89

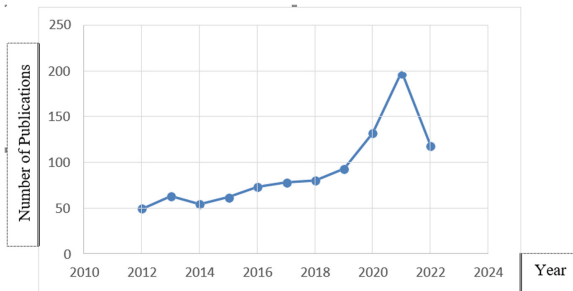


Fig. 2. Development of Civic Education E-learning Research

- 1) Cluster 1 consists of 66 red items, 66 items are 21st century skills, absence, academic, age, artificial intelligence, assessment, citizenship education, civic engagement, creation, culture, curriculum, digital camera, digital education, digital format, digital library, digital revolution, digital tool, e portfolio, education, education process, educational material, educational system, element, environment, Europe, evaluation, factor, function, future, gender, global citizenship, hand, improvement, initiative, integral part, management system, mobile learning, network, new medium, organization, place, point, possibility, preparation, primary education, relation, requirement, school subject, secondary education, secondary school, serious game, set, stage, state, structure, teaching, technique, threat, topic, transformation, turn, understanding, unit, university student, view, vision.

- 2) Cluster 2 consists of 59 green items, the 59 items are advent, agriculture, analysis, area, benefit, business, case study, citizen engagement, citizenship, college, connection, course, delivery, digital medium, digital transformation, digitalization, distance, e government, e health, e learning program, employee, European union, evolution, Facebook, game, generation, government, graduate student, high school, high school student, impact instructor, knowledge economy, leader, learning, nature, online education, overview, performance, policy popularity, progress, report, service learning, social responsibility, space, students perspective, support, Sweden, tertiary education, text, type, usefulness, video game, virtual world, workforce, world, writing, Zimbabwe.
- 3) Cluster 3 consists of 58 blue items, the 58 items are access, addition, adoption, adult education, advantage, Africa, awareness, capability, capacity, challenges, child, citizen, civic action, condition, consequence, corona virus, digital divide, digital immigrant, digital inequality, digital native, e learning technology, educational level, elearning, face, help, increase, India, inequality, influence, information technology, internet use, Kenya, learner, lever, LMS, lot, management, media literacy, middle, number, project, provision, public policy, public university, responsibility, service, situation, smart city, social capital, social engagement, social exclusion, social inclusion, social justice, social medium, societal problem, solution, staff, utilization
- 4) Cluster 4 consists of 54 yellow items, 54 items in this cluster are adult, barrier, call, Canada, country, current research, digital environment, digital gap, digital inclusion, digital learning, direction, effective use, equality, evidence, example, experience, girl, home, icet, icet skill, icts, implication, inclusion, individual, information communication, information literacy, information literacy skill, integration, language, language learning, library, life, lifelong learning, literacy, literacy skill, migrant, mobile technology, object, person, program, qualitative analysis, reason, refugee, resource, role, society, stakeholder, strategy, sustainable development, teacher education, theory, usage, woman, work.
- 5) Cluster 5 consists of 53 purple items. The 53 items in this cluster are accessibility, adolescent, author, campus, century skills, context, digital economy, digital equity, digital literacy skills, digital platform, digital readiness, digital world, educational institution, educational setting, essential skills, fact, framework, gamification, heis, higher education, higher education institution, higher education student, Indonesia, issue, large number, lecturer, lens, literature, module, online, online learning, Pakistan, pandemic covid, participation, political participation, practice, processes, readiness, review, skills, social network, social networking site, stem education, survey, systematic literature review, systematic review, teacher professional development, teaching practice, theme, tool, twitter, undergraduate student, way.
- 6) Cluster 6 consists of 49 black items, these 49 items consist of ability, account, achievement, approach, aspect, care, center, class, classroom, communication skill, data, design principle, difference, digital generation, digital literacy, e teaching, educational, educational process, effect, English, English language, era, informal learning, interaction, interest, internet, learning process, learning skill, line, model, part, perception, permission, premise, product, reflection, skill, social software, social studies education, social study, student, students ability, students motivation, technology, term, thing, trust, web, website.

- 7) Cluster 7 consists of 44 orange items, 44 items in this cluster, namely app, article, attention, basis, change, civic, civic competence, civic education, community, consideration, digital, digital access, digital society, discipline, economy, emergency remote teacher, focus, gap, geography, global citizenship education, globalization, history, humanity, indicator, instance, instruction, Japan, key competence, law, lesson, Malaysia, open education, outcome, pedagogy, perspective, problem, question, relationship, researcher, satisfaction, school, self, social network site, today.
- 8) Cluster 8 consists of 42 brown items, those 42 items are adaptation, android, collaboration, collaborative learning, constraint, contribution, creative thinking skill, creativity, critical review, critical thinking skill, digital badge, digital citizenship, digital citizenship education, digital game, digital learning environment, digital space, digital story, digital storytelling, e learning environment, e learning system, effectiveness, engagement, expertise, field, goal, insight, involvement, m learning, mooc, motivation, online teaching, Pancasila, participant, play, research, scenario, scholarship, study, teacher, user, validation, video.
- 9) Cluster 9 consists of 36 magenta colored items, the 36 items are abstract, catalyst, challenge, comparative analysis, comparison, computer, content, covid, crisis, digital collaboration, digital device, digital resource, education sector, educational technology, emergency, European country, group, growth, lack, mode, need, new challenge, Nigeria, opportunity, pandemic, paper, principle, prospect, quality, response, success, system, technology integration, time, virtual classroom, vocational education.
- 10) Cluster 10 consists of 35 pink items, 35 items in this cluster are character education, curriculum development, definition, degree, digital era, digital technology, digital textbook, disruption, e assessment, facility, faculty, flipped classroom, form, formation, google classroom, knowledge, learning activity, light, link, ministry, open access, pre service teacher, professional development, profile, program, reality, social, social skill, student engagement, sustainability, sustainable development, training, use, value, years.
- 11) Cluster 11 consists of 31 light green items, the 31 items are 21stblenden, book, casem civic skills, demand, development, dimension, e learning model, e learning platform, e learning service, e learning tool, educational research, effort, electronic learning, enhancement, implementation, innovation, institution, journal, literature review, moodle, period, platform, professional competence, professional skill, school education, soft skill, university, variety, Zambia.
- 12) Cluster 12 consists of 29 light blue items, 29 items in this cluster are activity, analytic, application, availability, blended learning, communication technology, complexity, digital competency, digital form, digital information, digital skills, distance learning, e commerce, e-commerce. Governance, e learning, education system, emergence, first year, general education, high level, information, kind, odl, open, order, profession, psychology, scope.
- 13) Cluster 13 consists of 26 light yellow items, the 26 items are attitude, basic competence, communication, competence, competency, concept, convergence, critical thinking, digital age, digital competence, educator, foreign language, importance, instrument, investigation, master, media, media education, medium, science, sense, social science, spain, subject, tutor, youth.

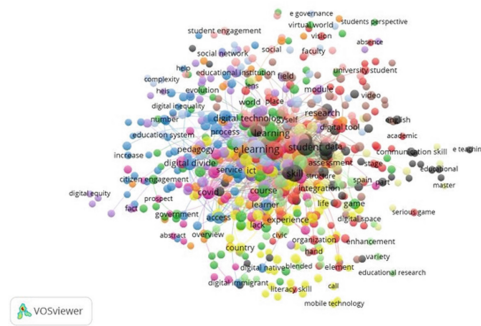


Fig. 3. Network Visualization of Civic Education E-Learning for Digital Civic Skill Keyword

Each cluster contains a different colored circle, which indicates the link between each term in the cluster. Each term's circle size fluctuates according to how frequently it is used in publications. The circle label size increases as the frequency of this term increases. Three components make up the mapping representation of the data examined in this study: network visualization (see Fig. 3), overlay visualization (see Fig. 4), and density visualization (see Fig. 5).

The association between the pertinent phrases for civic education through e-learning and the keyword “digital civic skill” is shown in Fig. 3. An interconnected network of 13 clusters that describes the relationship between the phrases. The network visualization reveals that cluster 12 has 495 links and a total link strength of 2614, and that it is used in research on e-learning for civic education (see Fig. 6). With a connection count of 21188 and a total link strength of 33625, the terms “education” and “civic skills” contained cluster 13 (see Fig. 7). With 111 links and a total link strength of 156, cluster 7 is included in the phrase “civic education” (see Fig. 8).

Figure 4 shows the overlay visualization in civic education e-learning for digital civic skills keyword. This overlay visualization shows the novelty of research on related terms. Most of the popular terms are found in the time range from 2017 to 2020. The difference in the regency of the terms is indicated by the color difference. The terms found in 2017 are dark blue, 2018 is light blue, 2019 is turquoise green, 2020 is green, and 2021 is yellow. The popularity of the term civic education e-learning has been around for a long time. Thus we can easily make new research on civic education e-learning for digital civic skills.

Figure 5 shows the density visualization of civic education e-learning for digital civic skill keyword. The data visualization demonstrates that a term's frequency of use in Google Scholar articles increases with the brightness of the yellow hue and the size of the label term's circle. This implies that extensive research is conducted on related terms. Conversely, if the color of the term fades and approaches the background color, then the term is rarely used in publications and research. Figure 5 shows that research and publications in the last 10 years from 2012 to 2022 the terms that are often used are e learning, learning, student, and skills.

Figure 6 shows the visualization of the terms activity, analytic, application, availability, blended learning, communication technology, complexity, digital competency,

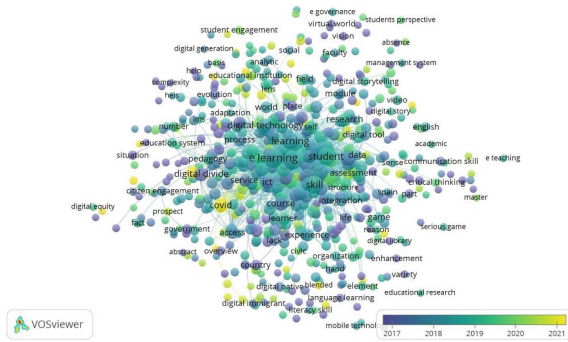


Fig. 4. Overlay visualization of Civic Education E-Learning For Digital Civic Skill Keyword

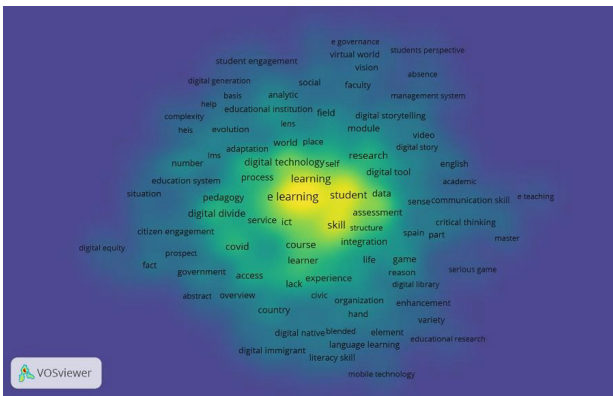


Fig. 5. Density visualization of Civic Education E-Learning For Digital Civic Skill Keyword

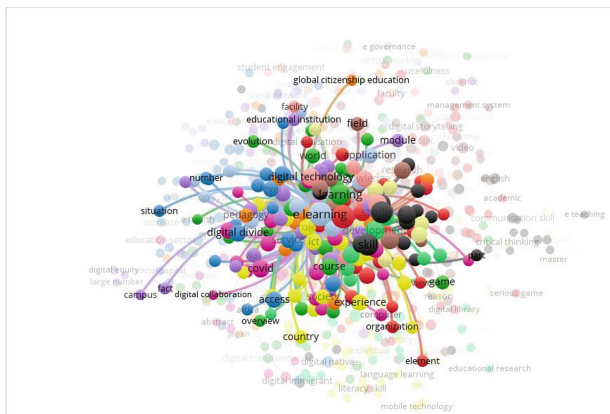


Fig. 6. Network Visualization of E-Learning

education, and skills are the only words frequently used in studies. We can look for fresher and more recent civic education e-learning research based on the findings of this study.

4 Conclusion

Analysis of bibliometric computational mapping of article data with the research theme “Civic Education E-Learning” was the goal of this work. The articles were found on Google Scholar by using the Publish or Perish program. The search was conducted based on relevant titles and abstracts in the last 10 years between 2012 and 2022. The search results found 993 papers with 16457 citations deemed relevant. The highest number of citations occurred in 2018 as many as 2574 citations. In the publication trend, the most publications occurred in 2021 as many as 197 publications. Publications fluctuate from year to year. There will be more research in 2020–2021, going from 130 studies in 2020 to 197 studies in 2021. However, it dropped back to 116 studies in 2022. According to the study’s findings, there is still a good probability that other terms will come up while researching civic education online.

References

1. M. Peart, S. Cubo-Delgado, and P. Gutiérrez-Esteban, “Exploring the Role of Digital and Socio-civic Skills for Promoting Youth Participation and Digital Citizenship,” *Eur. J. Educ. Res.*, vol. 11, no. 2, 2022, <https://doi.org/10.12973/eu-jer.11.2.697>.
2. M. T. Peart, Prudencia Gutiérrez-Esteban, and S. Cubo-Delgado, “Development of the digital and socio-civic skills (DIGISOC) questionnaire,” vol. 68, pp. 3327–3351, 2020, <https://doi.org/10.1007/s11423-020-09824-y>.
3. N. Donthu, S. Kumar, D. Mukherjee, N. Pandey, and W. M. Lim, “How to conduct a bibliometric analysis: An overview and guidelines,” *J. Bus. Res.*, vol. 133, 2021, <https://doi.org/10.1016/j.jbusres.2021.04.070>.
4. R. Deti and V. Mandasari, “A Bibliometric Analysis of E-Learning Research Trends,” *Int. J. Theory Appl. Elem. Second. Sch. Educ.*, vol. 3, no. 1, 2021, <https://doi.org/10.31098/ijtaese.v3i1.518>.
5. E. Djeki, J. Dégila, C. Bondiombouy, and M. H. Alhassan, “E-learning bibliometric analysis from 2015 to 2020,” *J. Comput. Educ.*, 2022, <https://doi.org/10.1007/s40692-021-00218-4>.
6. S. Das, “Research Trends of E-Learning: A Bibliometric and Visualisation Analysis,” *Libr. Philos. Pract.*, vol. 2021, 2021.
7. J. A. Marín-Marín, J. López-Belmonte, J. M. Fernández-Campoy, and J. M. Romero-Rodríguez, “Big data in education. A bibliometric review,” *Soc. Sci.*, vol. 8, no. 8, 2019, <https://doi.org/10.3390/socsci8080223>.
8. K. C. Li and B. T. M. Wong, “Research landscape of smart education: a bibliometric analysis,” *Interact. Technol. Smart Educ.*, vol. 19, no. 1, 2022, <https://doi.org/10.1108/ITSE-05-2021-0083>.
9. M. Bozkurt, O. Eryilmaz, and C. Boyraz, “Science Mapping Research on Citizenship Education: A Bibliometric Review,” *Int. J. Soc. Educ. Sci.*, vol. 3, no. 4, 2021, <https://doi.org/10.46328/ijonses.148>.
10. T. PALAZ, “GLOBAL CITIZENSHIP AND EDUCATION: A BIBLIOMETRIC RESEARCH,” *Int. J. Educ. Technol. Sci. Res.*, vol. 6, no. 16, 2021, <https://doi.org/10.35826/ijetsar.416>.

11. E. A. Mora, B. C. Torres, J. C. M. Castro, and D. Schugurensky, "Innovative practices in civic education. What do Spanish academic journals say?," *Rev. Fuentes*, vol. 22, no. 2, 2020, <https://doi.org/10.12795/revistafuentes.2020.v22.i2.09>.
12. E. Krisnaningsih, M. A. Nurdiana Putri, T. Irba, N. Suppto, U. A. Deta, and E. Hariyono, "Bibliometric Analysis of Multi Representation Based on Problem-Solving Skills Using VOSviewer," *Berk. Ilm. Pendidik. Fis.*, vol. 9, no. 3, 2021, <https://doi.org/10.20527/bipf.v9i3.11329>.
13. J. Lin, "Positioning the research on skills for entrepreneurship through a bibliometric analysis," *Entrep. Educ.*, vol. 4, no. 4, 2021, <https://doi.org/10.1007/s41959-021-00061-9>.
14. P. Hallinger and C. Chatpinyakoo, "A bibliometric review of research on higher education for sustainable development, 1998- 2018," *Sustainability (Switzerland)*, vol. 11, no. 8. 2019, <https://doi.org/10.3390/su11082401>.
15. C. R. Jiménez, M. S. Prieto, and S. A. García, "Technology and higher education: A bibliometric analysis," *Educ. Sci.*, vol. 9, no. 3, 2019, <https://doi.org/10.3390/educsci9030169>.
16. I. Goksu, "Bibliometric mapping of mobile learning," *Telemat. Informatics*, vol. 56, 2021, <https://doi.org/10.1016/j.tele.2020.101491>.
17. Y. Zhang and P. Wang, "Twenty Years' Development of Teacher Identity Research: A Bibliometric Analysis," *Front. Psychol.*, vol. 12, 2022, <https://doi.org/10.3389/fpsyg.2021.783913>.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

