



Journal of Education, Teaching, and Learning is licensed under
A [Creative Commons Attribution-NonCommercial 4.0 International License](https://creativecommons.org/licenses/by-nc/4.0/).

SWIMMING EDUCATION IN SCHOOLS : A BIBLIOMETRIC ANALYSIS OF TRENDS AND DEVELOPMENTS

Soleh¹⁾, Mustika Fitri²⁾, Sandey Tantra Paramitha³⁾, Hilmy Apriady⁴⁾,

¹⁾ Univeristas Pendidikan Indonesia, Bandung, Indonesia

E-mail: soleh@upi.edu

²⁾ Univeristas Pendidikan Indonesia, Bandung, Indonesia

E-mail: mustikafitri@upi.edu

³⁾ Univeristas Pendidikan Indonesia, Bandung, Indonesia

E-mail: sandeytanra18@upi.edu

⁴⁾ Univeristas Pendidikan Indonesia, Bandung, Indonesia

E-mail: hilmyapy@upi.edu

Abstract. This study investigates the trends and developments in swimming education in schools from 2010 to 2024 through a bibliometric analysis. Utilizing data from Scopus, this research analyzes publication trends, authorship contributions, and international collaborations in the field of school swimming education. The results reveal a significant increase in the number of publications, particularly over the last six years, indicating a growing awareness of swimming education's importance as an integral part of school curricula for safety, physical fitness, and character development. Key authors, including Kevin Moran and Amy E. Peden, were found to contribute substantially to the literature, particularly on water safety and swimming skills. The United States, Australia, and the United Kingdom emerged as leading contributors, with the U.S. positioned as a central node in international collaboration networks. Furthermore, keyword analysis highlighted themes such as "swimming education," "water safety," and "physical health," underscoring the focus on skill development and student safety. Overall, this study highlights the critical role of swimming education in forming resilient, health-conscious young individuals and underscores the need for policies that support accessible swimming programs in schools globally. These findings provide a foundation for further research and policy-making aimed at enhancing the effectiveness and reach of swimming education in educational settings worldwide.

Keywords: Swimming Education, School Curriculum, Water Safety, Bibliometric Analysis, Physical Education Trends,

I. INTRODUCTION

Swimming can be defined as the ability to move in water with effective propulsion, enjoy the water, and master various skills, both above and below the water.(Kamaruzaman et al., 2024; King et al., 2020) Not only does it serve as a physical activity that improves fitness, but it is also a crucial skill in the context of water safety.(Chrobot & Kjendlie, n.d.; Peden et al., 2024) The World Health Organization (WHO) notes that drowning is one of the leading causes of death for children, especially in countries with large areas of water or that experience frequent flooding.(Roberts et al., 2024; Willcox-pidgeon et al., 2020). Swimming education in schools has become one of the important aspects in the development of students' physical and safety skills. (Carolina, Kim, et al., 2023; Ivanenko et al., 2020; Sundan & Haga, 2024) Therefore, integrating swimming education in the school curriculum is

a strategic step to reduce the risk of drowning and educate students on the importance of water safety. (Peden, 2020; Zhu et al., 2023)

A number of previous studies have highlighted the benefits of swimming education, both in terms of students' physical and mental health.(Overbury et al., 2023; Zhang & Liu, 2024) Several studies have found that students who participate in swimming programs tend to have better cardiovascular health. (Dar & Jain, 2020; Van Der Rowe, 2023; Wróblewski, 2024) And the stress level of students who participated in the swimming program was lower than students who did not participate in the program.(Acordi et al., 2019; Yadolahzadeh, 2020) In addition, other studies have also shown that swimming skills can improve students' self-confidence and social skills.(Alshorman et al., 2024; Orabi et al., 2021) In addition to these benefits, recent studies have also begun to highlight how swimming education or learning can contribute to the development of better discipline, responsibility, and emotional coping skills among

students.(Krieger, 2024; Murdoch & Hong, 2024) There is a growing body of evidence to support swimming education as an important pillar of physical education, (Carolina, Lee, et al., 2023; Sawicki, 2020) schools in various countries are starting to integrate swimming programs more systematically in their curriculum.(Kim et al., 2022; Moura et al., 2022) Swimming education is also part of the effort to create a generation that is healthy, resilient, and able to adapt to diverse environments.(Britton, 2020; Zafar et al., 2024) However, the implementation of swimming education in schools is not always evenly distributed, as challenges include a lack of swimming pool facilities, a shortage of qualified instructors, and education policies that do not fully support the program. (Olstad et al., 2021) While there are numerous studies that support the benefits of swimming education, there are limited studies that analyze the development of literature and research trends related to this topic globally.(Huang et al., 2023; Morais et al., 2024)

Bibliometric analysis is now recognized as one of the key methods in exploring trends, patterns, and overall development of scientific literature.(Garg et al., 2023; Liu et al., 2022; Passas, 2024) Using mathematical methods, network analysis, and clustering algorithms, influential researchers, institutions, and journals can be identified, and current research trends in a particular field can be recognized.(Apriady, 2024; Gyeom et al., 2024; Rizky et al., 2022) This study aims to analyze the trend and development of swimming education in schools between 2010 and 2024 using bibliometric analysis method. Through the analysis of academic publications from various journals and scientific sources, this study examines the network of events containing keywords selected by the authors, and evaluates the growth patterns in publications and citations. (Baas et al., 2020; Tang et al., 2021) In addition, the research also examines key developments and trends in the field of swimming education, leading authors, influential journals, and countries actively contributing to the field. With these findings, researchers and readers can monitor the development and expansion of swimming education-related subjects, identify under-covered research gaps, and understand current and future areas of study.

II. METHODS

In this study, a bibliometric analysis method was used to identify trends, patterns, and developments in the literature related to swimming education in schools.(Donthu et al., 2021; Herlina et al., 2025; Polat & A, 2024; Rincón et al., 2023) This method was chosen for its ability to provide a comprehensive overview of the relationships between researchers, journals, institutions, and emerging research topics in the field.(Goyal & Kumar, 2020; Özkadı et al., 2022; Wen et al., 2024) Bibliometric analysis allows researchers to map the growth of the literature and reveal dominant areas of research with potential for further development.(Apriady et al., 2023; Moral-muñoz et al., 2020)

Research data was obtained from the Scopus database provided by Elsevier which is known for its wide coverage and high credibility in providing relevant academic

publications.(Apriady et al., 2024; Yubo et al., 2023) The publications included journal articles, conference proceedings, and other scientific documents related to swimming education in schools. The analysis process began with a literature search using keywords such as Swimming and Education. Once the data was collected, several steps of analysis were performed. First, publications were analyzed based on number per year and number of citations to identify trends in literature growth. Secondly, a network analysis was conducted to reveal the relationships between researchers, institutions and countries contributing to the study. Clustering algorithms were used to identify major themes and recent trends in the field of swimming education. VOSviewer software was used to visualize collaboration networks and patterns emerging from the bibliometric data.

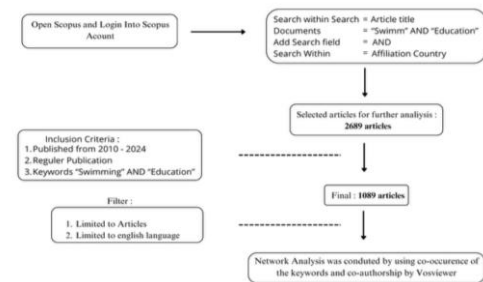


Fig. 1. Document Article Filtering Process in Scopus

In addition, this study also utilized data from Scopus, where approximately 1089 articles were published in the last 14 years, from 2010 to 2024. The exploration of Scopus data was conducted on October 17, 2024 and focused on collecting journals and articles related to swimming education by extracting bibliographic data including citations, keywords, abstracts, and key findings from relevant articles. To keep the focus on genuinely related literature, filters were applied so that only articles discussing swimming education and school sport were included in the analysis, and the specific keywords used are outlined below.

TITLE-ABS-KEY (swimming AND education) AND PUBYEAR > 2009 AND PUBYEAR < 2025 AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (LANGUAGE , "English"))

III. RESULTS

1) Document Published

From 2010 to 2024, researchers from various countries have published a number of articles related to swimming education in schools. The trend of publications related to swimming education during this period is shown in Figure 2. Based on analysis of the Scopus database, in 2010 there were 43 articles published. In 2011, this number increased to 46 articles, in 2012 the number of articles increased to 52, in 2013 there was another increase in the number of articles to 68, and 2014 there was a significant increase to 86 articles published. But in the following year 2015 there was a fairly drastic decline of 63 articles. In 2016 there was another decline to 56 articles. And in 2017, 2018, and 2019 the

number of articles fluctuated to 65, 61 and 66 articles respectively. Starting in 2020, the number of publications again showed an increasing trend, with 87 articles published in that year. The increase continued until it reached 105 articles in 2021, in 2022 it decreased again to 94 articles, and in 2023 it experienced an increasing trend again to 98 articles, the peak in 2024 the articles published totaled 99 articles. When viewed from the last 6 years, the increasing

trend is very significant from 2018 to 2024, reflecting the growing attention to research in the field of swimming education, in line with the increasing awareness of the importance of swimming ability as a safety skill and physical activity in schools. Although in the last 3 years the total number of article publications could not exceed the number of publications in 2021.

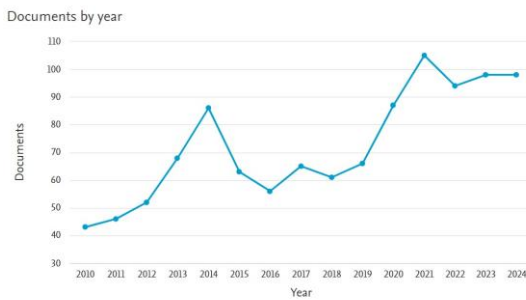


Fig. 2. Document Published on Scopus Databases

Table 1 displays the top 10 authors with the most influential articles in the research on Swimming Education in schools. The article with the highest number of citations is Sacher et al., with a total of 252 citations. In second place is Munari et al., with 202 citations. Third place is Shuai et al., with 189 citations. Dahmann et al. occupies the fourth position with 181 citations. Furthermore, articles written by Aubry, Kopman, Kerr, Swenson and Dangkas each have less than 170 citations.

Table 1. Top 10 Articles with the most citations on Scopus

No	Document Title	Authors and Year	Citations Total
1	Randomized controlled trial of the MEND program: A family-based community intervention for childhood obesity	(Sacher et al., 2009)	252
2	Marine litter on Mediterranean shores: Analysis of composition, spatial distribution and sources in north-western Adriatic beaches	(Munari et al., 2015)	202
3	Thermal Vibration Correlation Function Formalism for Molecular Excited State Decay Rates	(Shuai, 2020)	189
4	The active city? Disparities in provision of urban public recreation resources	(Dahmann et al., 2010)	181
5	Effects of water exercise swimming program on aquatic skills and social behaviors in children with autism spectrum disorders	(Pan, 2010)	170

2) Author Analysis

Figure 3. shows that among the top 10 most productive researchers in the field of school swimming education, some have made significant contributions through their publications. Researchers such as Moran Kevin, Peden Amy

6	Evidence of disturbed sleep and increased illness in overreached endurance athletes	(Aubry et al., 2014)	167
7	Design, modeling, and characterization of a miniature robotic fish for research and education in biomimetics and bioinspiration	(Kopman et al., 2013)	143
8	Epidemiology of exertional heat illness among U.S. High School Athletes	(Kerr et al., 2013)	139
9	Epidemiology of US High School sports-related ligamentous ankle injuries, 2005/06-2010/11	(Swenson et al., 2013)	131
10	Multiple voices: Improving participation of muslim girls in physical education and school sport	(Dagkas et al., n.d.)	127

E have contributed greatly by publishing 11 documents of articles. And Franklin Richard C, Knechtle Patrizia, Roseman Thomas, Seifert Ludovic, Quan Linda, Petras Lauren A and Brander Robert W, have also made important contributions with five to eight articles addressing crucial aspects of research related to swimming education in schools. In terms of number of citations, Knechtle, Patrizia have the highest citations thanks to two different documents of 6 and 7 documents respectively, which shows a remarkable level of productivity. These researchers reflect their dedication to advancing innovation and knowledge in the field of swimming education especially for school children. This research aligns with these studies, especially in the context of school swimming education, where trends, patterns and literature contributions from prolific researchers in the field of sport can help identify important areas for further development. Contributions that focus on sport and physical education for children, as analyzed in this study, provide a strong basis for further developing effective swimming education programs in schools.

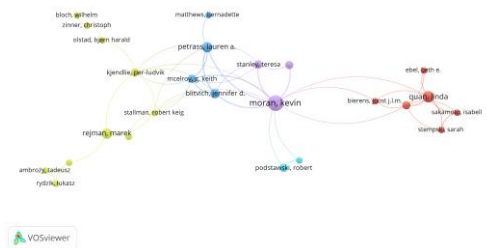


Figure 3. Productive Authors based on Documents and Citation

Table 2. Authors. Document and Citations.

Rank	Author	Doc.	Cite	Rank	Author	Doc.	Cite
1	Moran, Kevin	11	202	6	Knechtle, Patrizia	6	238
2	Peden, Amy E	11	90	7	Seifert, Ludovic	6	155
3	Franklin, Richard C	8	121	8	Quan, Linda	6	141
4	Knechtle, Patrizia	7	249	9	Petrass, Lauren A	5	139
5	Rosemann, Thomas	6	226	10	Brander, Robert W	5	54

3) Country Analysis

Table 3 shows the top 10 countries based on the number of documents generated. The United States is in first place with 230 documents, followed by Australia with 137 documents, as well as the UK with 97 documents, Spain, China and Brazil which produce 52, 51, and 50 documents

respectively. While from Canada, Poland, Germany and France all documents are below 50 documents, still in Table 3 also shows the 10 countries with the most citations, where the United States is ranked first with a total of 4033 citations, followed by Australia with 2551 citations, and the UK with 1826. And other countries such as Spain, China, Brazil, Canada, Poland Germany and France the number of citations is below 1000. Figure 4 illustrates the collaboration network map, where the United States has the most significant central role, followed by Australia, the UK, Spain and China. These countries show close collaboration with other countries and have a strong academic presence in the research field..

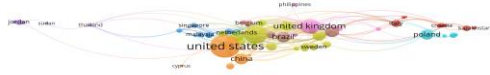


Fig 4. Most productive countries based on documents and citations

Table 3. Country. Document and Citations.

Rank	Author	Doc.	Cite	Rank	Author	Doc.	Cite
1	United States	230	4033	6	Brazil	50	664
2	Australia	137	2551	7	Canada	47	696
3	United Kingdom	97	1826	8	Poland	46	379
4	Spain	52	601	9	Germany	45	840
5	China	51	704	10	France	38	839

4) Co-occurrence Analysis of Keywords

Keywords can provide deep insights into the core content of an article. When two or more keywords appear simultaneously in the same article, this is referred to as co-keywords (Su & Lee, 2010). In the world of scientific knowledge, co-keyword analysis is used to identify popular research topics and trace the boundaries of research (Chen, Dubin, & Kim, 2014; Lee & Su, 2010). In this study, co-keyword analysis was conducted using VOSviewer software with the fractional counting method. This study stipulates that each keyword must appear at least twice, and the unit of analysis used is the author's keyword. The results of this keyword clustering are presented in Table 4 and Figure 5, which show clusters of relevant research topics.

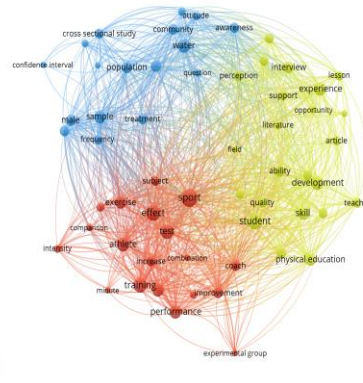


Fig 5. Keyword Analysis

Table 4. Clusters and keywords based on VOSviewer

Cluster	Item	Colour	Percent	Total
Cluster 1	Ability, article, class, development, effectiveness, field, Implication, importance, interview, lesson, literature, opportunity, paper, parent, perception, physical education, process, quality, skill, student, support, teacher.	Green	39%	23
Cluster 2	Athlete, coach, combination, comparison, competition, effect, exercise, experimental group, improvement, increase, minute, performance, significant difference, sport, subject, swimmer, test, training.	Red	32%	19
Cluster 3	Attitude, awareness, community, confidence interval, cross sectional study, female, frequency, heat education, information, male, percent, population, question, respondent, sample, treatment, water.	Blue	29%	17
Total			100%	59

IV. DISCUSSION

The results of this study show a significant increase in publications related to swimming education in schools over the period 2010 to 2024. A consistent increase was particularly evident in the last six years, reflecting a growing awareness of the importance of swimming education as an integral part of the school curriculum. This trend indicates that swimming education is beginning to be recognized not only as a physical activity, but also as an essential safety skill. The number of publications peaking in 2024, with 99 articles, reinforces the view that swimming education has far-reaching benefits, both in terms of water safety and students' physical and character development.

An analysis of researcher contributions shows that a number of researchers, such as Kevin Moran and Amy E. Peden, have played a significant role in expanding the swimming education literature, particularly in relation to water safety and swimming training for school students. The success of these researchers, demonstrated through their high number of publications, demonstrates a dedication to developing understanding in this area. Dr. Knechtel Patrizia's research, with its high number of citations, shows great influence in the development of swimming education policy and practice, indicating that their work has made an important contribution to future research directions.

In addition, the United States leads in the number of publications related to this topic, followed by Australia and the United Kingdom, with each country demonstrating

educational policy support for school swimming programs. The United States also has a close network of international collaborations with countries including Australia, the United Kingdom and China, demonstrating the importance of global collaboration in setting swimming education standards that can be adopted internationally to improve student safety around the world.

Analysis of the co-occurrence of keywords in this study also revealed key topics in the school swimming education literature. Themes such as “swimming education,” “water safety,” and “physical health” emerged as dominant topics, indicating that researchers' attention is currently focused on the development of swimming skills as part of physical education as well as the importance of student safety in the water. These groupings provide a view of the main trends in research as well as indicating areas that still require further exploration.

Overall, the findings from this study highlight that swimming education is increasingly recognized as an important component of students' education globally. An increasing number of publications, significant contributions from leading researchers and extensive international collaboration demonstrate that swimming education has a key role to play in shaping a generation that is healthy, resilient and ready to face environmental challenges. These findings provide a strong foundation for the development of more effective swimming education programs and support efforts to improve the safety and health of students worldwide.

V. CONCLUSIONS

In summary, this study provides a comprehensive insight into the evolution, trends and collaborative dynamics of research in school Swimming Education from 2010 to 2024. Based on publications in the Scopus database, the findings reveal that: the number of publications has been increasing, although there is an up and down trend from year to year, The analysis reveals a fluctuating publication pattern, the beginning of which shows that the trend increases in 2019, and in the peak year of the most publications 2021, then in the last year 2024 the publication trend decreases but not so drastically. this shows that the scientific interest and investment in this field is so great. Significant contributions highlighted include Sacher's (2017) Family-based community interventions to address childhood obesity, which garnered 252 citations, underscoring critical challenges and opportunities in the domain. Top researchers such as Munari, Shuai, Dahmann, Pan, and Aubry, have played an important role in advancing knowledge through prolific publications. The United States' dominance in document and citation production, coupled with the strong international collaboration visualized in Figure 4, underscores its leadership and influence in shaping the global research agenda. However, the limitations of language bias, publication selectivity and bibliometric approaches suggest opportunities for future research to explore broader literature sources and qualitative dimensions

to enhance our understanding and application of comprehensive School Swimming education.

REFERENCES

- Acordi, L., Silva, D., Doyenart, R., Salvan, P. H., Lopes, J. F., Gomes, K., Thirupathi, A., Pinho, A. De, Silveira, P. C., Acordi, L., Silva, D., Doyenart, R., & Salvan, P. H. (2019). Swimming training improves mental health parameters , cognition and motor coordination in children with Attention Deficit Hyperactivity Disorder. *International Journal of Environmental Health Research*, 00(00), 1–9. <https://doi.org/10.1080/09603123.2019.1612041>
- Alshorman, A., Oudat, A., Obeidat, M., Shaer, A., & Eid, S. A. (2024). *The Psychological Reluctance Among Female Students when Performing Belly Crawl Swimming in Deep Areas*. 4883, 1786–1794.
- Apriady, H. (2024). *Feasibility Study of Technology Footwork Ability Test on National*. 7(June), 1132–1138. <https://doi.org/10.33438/ijds.1503445>
- Apriady, H., Fitri, M., & Ockta, Y. (2023). *TRENDS AND DEVELOPMENTS IN PHYSICAL EDUCATION FOR DISABILITIES* : 9(1), 112–119.
- Apriady, H., Robandi, B., Fitri, M., Indonesia, U. P., Barat, J., No, S., Bandung, K., & Barat, J. (2024). *Jurnal dunia pendidikan*. 220–232.
- Aubry, L., Bonnet, G., Duffield, R. O. B., Hausswirth, C., & Louis, J. (2014). *Illness in Overreached Endurance Athletes*. <https://doi.org/10.1249/MSS.0000000000000177>
- Baas, J., Schotten, M., & Plume, A. (2020). *Scopus as a curated , high-quality bibliometric data source for academic research in quantitative science studies*.
- Britton, E. (2020). *Sensing Water : Uncovering Health and Well-Being in the Sea and Surf*. 1–28. <https://doi.org/10.1177/0193723520928597>
- Carolina, N., Kim, M., Lee, H., & Lee, J. (2023). *Improvement of Survival Swimming Education Operations during*. 453–457. <https://doi.org/10.2112/JCR-SI116-092.1>
- Carolina, N., Lee, Y., & Kwon, S. (2023). *Examining the Role of Swimming and Water Safety Education Curriculums (SWSCs) in Korean Physical and Health Education Programs*. 473–477. <https://doi.org/10.2112/JCR-SI116-096.1>
- Chrobot, M., & Kjendlie, P. (n.d.). *Perceived Versus Real Swimming Skills of Adolescents under Standard and Challenging Conditions : Exploring Water Competencies as an Approach to Drowning Prevention*.
- Dagkas, S., Benn, T., Jawad, H., & Benn, T. (n.d.). *Multiple voices : improving participation of Muslim girls in physical education and school sport Multiple voices : improving participation of Muslim girls in physical education and school sport. August 2015*. <https://doi.org/10.1080/13573322.2011.540427>
- Dahmann, N., Wolch, J., Joassart-marcelli, P., Reynolds, K., & Jerrett, M. (2010). *Health & Place The active city ?*

- Disparities in provision of urban public recreation resources. *Health & Place*, 16(3), 431–445. <https://doi.org/10.1016/j.healthplace.2009.11.005>
- Dar, S. A., & Jain, R. (2020). *Effect of swimming on cardiovascular endurance of secondary school students of District Shopion in J & K UT*. 7(5), 92–95.
- Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Marc, W. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research*, 133(March), 285–296. <https://doi.org/10.1016/j.jbusres.2021.04.070>
- Garg, G., Shamshad, M., Gauhar, N., Tabash, M. I., Hamouri, B., & Daniel, L. N. (2023). *A Bibliometric Analysis of Fintech Trends: An Empirical Investigation*.
- Goyal, K., & Kumar, S. (2020). *Financial literacy: A systematic review and bibliometric analysis*. July, 1–26. <https://doi.org/10.1111/ijcs.12605>
- Gyeom, H., Hwa, K., & Recknagel, F. (2024). Ecological Informatics Bibliometric network analysis of scientific research on early warning signals for cyanobacterial blooms in lakes and rivers. *Ecological Informatics*, 80(January), 102503. <https://doi.org/10.1016/j.ecoinf.2024.102503>
- Herlina, S., Kusumah, Y. S., & Juandi, D. (2025). *Global Research on Emerging Digital Technology: A Bibliometric Analysis*. 2(2), 281–294.
- Huang, D., Huang, B., & Wang, X. (2023). *Analysis of Hotspots and Contents of Foreign* (Vol. 1). Atlantis Press SARL. <https://doi.org/10.2991/978-2-494069-45-9>
- Ivanenko, S., Tyshchenko, V., Pityn, M., Hlukhov, I., Drobot, K., Dyadchko, I., Zhuravlov, I., & Omelianenko, H. (2020). *Original Article Analysis of the indicators of athletes at leading sports schools in swimming*. 20(4), 1721–1726. <https://doi.org/10.7752/jpes.2020.04233>
- Kamaruzaman, S., Ali, S., Zulnaidi, H., Sutapa, P., Hardianto, D., & Auliana, R. (2024). *No Title*. 2041, 1415–1423.
- Kerr, Z. Y., Casa, D. J., Marshall, S. W., & Comstock, R. D. (2013). Epidemiology of Exertional Heat Illness Among U.S. High School Athletes. *AMEPRE*, 44(1), 8–14. <https://doi.org/10.1016/j.amepre.2012.09.058>
- Kim, Z. W., Seo, M. S., Lee, J. W., & Moon, H. W. (2022). *Study on the Actual Condition of Domestic and Foreign Survival Swimming Programs*. 6(3), 1–7.
- King, D., Chan, C., Sing, A., Lee, Y., Hamilton, K., King, D., Chan, C., Sing, A., Lee, Y., & Hamilton, K. (2020). Descriptive epidemiology and correlates of children's swimming competence. *Journal of Sports Sciences*, 38(19), 2253–2263. <https://doi.org/10.1080/02640414.2020.1776947>
- Kopman, V., Member, S., Porfiri, M., & Member, S. (2013). *Design, Modeling, and Characterization of a Miniature Robotic Fish for Research and Education in Biomimetics and Bioinspiration*. 18(2), 471–483.
- Krieger, J. (2024). Sport in History Knowledge, care, and discipline: the Dane Ingeborg Paul-Petersen as a pioneer in women's swimming coaching. *Sport in History*, 44(2), 216–236. <https://doi.org/10.1080/17460263.2024.2355462>
- Liu, C., Li, W., Xu, J., Zhou, H., Li, C., & Wang, W. (2022). Global trends and characteristics of ecological security research in the early 21st century: A literature review and bibliometric analysis. *Ecological Indicators*, 137(February), 108734. <https://doi.org/10.1016/j.ecolind.2022.108734>
- Morais, J. E., Barbosa, T. M., & Arellano, R. (2024). *and networks through a June*, 1–15. <https://doi.org/10.3389/fspor.2024.1413182>
- Moral-muñoz, J. A., Herrera-viedma, E., Santisteban-espejo, A., Cobo, M. J., Herrera-viedma, E., Santisteban-espejo, A., & Cobo, M. J. (2020). *Software tools for conducting bibliometric analysis in science: An up-to-date review*. 1–20.
- Moura, O. M., Marinho, D. A., Morais, J. E., Pinto, M. P., Faíl, L. B., & Henrique, P. (2022). *Learn-to-swim program in a school context for a twelve-week period enhance aquatic skills and motor coordination in Brazilian children Las clases de natación en el contexto escolar durante un período de doce semanas mejoran las habilidades acuáticas y la . 2041*, 316–324.
- Munari, C., Corbau, C., Simeoni, U., & Mistri, M. (2015). Marine litter on Mediterranean shores: Analysis of composition, spatial distribution and sources in north-western Adriatic beaches. *WASTE MANAGEMENT*. <https://doi.org/10.1016/j.wasman.2015.12.010>
- Murdoch, R., & Hong, H. J. (2024). *British elite swimmers' experiences and perspectives on life skill development*. March, 1–10. <https://doi.org/10.3389/fpsyg.2024.1344352>
- Olstad, B. H., Berg, P. R., & Kjendlie, P. (2021). *Outsourcing Swimming Education — Experiences and Challenges*.
- Orabi, S. M., Bayyat, M. M., & Altaieb, M. H. A. (2021). *Life Skills Acquired Through Swimming Context in Relation to Students' Academic Achievement*. 47(1).
- Overbury, K., Conroy, B. W., & Marks, E. (2023). Swimming in nature: A scoping review of the mental health and wellbeing benefits of open water swimming. *Journal of Environmental Psychology*, 90(January), 102073. <https://doi.org/10.1016/j.jenvp.2023.102073>
- Özkadı, T., No, O., Demir, E., & No, O. (2022). *Spor Bilimlerinde Yüzme Konusundaki Yayınların Bibliyometrik Analizi: Tıbbi Bir Bakış Açısı Bibliometric Analysis of Swimming Publications in Sports Science: A Medical Perspective*. 4(2), 39–48. <https://doi.org/10.52827/hititmedj.1121920>
- Pan, C. (2010). <http://aut.sagepub.com/>. <https://doi.org/10.1177/1362361309339496>
- Passas, I. (2024). *Bibliometric Analysis: The Main Steps*. 1014–1025.
- Peden, A. E. (2020). *Learning to Swim: An Exploration of Negative Prior Aquatic Experiences Among Children*.

- 1–16.
- Peden, A. E., Williamson, S., Fozard, F., Hanly, M., & Holger, M. (2024). *The effect of the 'Swim Reaper' program on water safety awareness, drowning mortality and morbidity among males aged 15 – 34 years in Aotearoa, New Zealand*. 88(June 2023), 190–198. <https://doi.org/10.1016/j.jsr.2023.11.006>
- Polat, H., & A, E. (2024). *A Bibliometric Analysis of Research on ChatGPT in Education To cite this article: A Bibliometric Analysis of Research on ChatGPT in Education*.
- Rincón, A. B., Trinidad, A., & López-valenciano, A. (2023). *Bibliometric study on artistic swimming*. September, 1–6. <https://doi.org/10.3389/fspor.2023.1196144>
- Rizky, A., Suksessanno, P., & Trinarningsih, W. (2022). *Heliyon Social network analysis in business and management research: A bibliometric analysis of the research trend and performance from 2001 to 2020*. *Heliyon*, 8(November 2021), e09270. <https://doi.org/10.1016/j.heliyon.2022.e09270>
- Roberts, K., Thom, O., Devine, S., Leggat, P. A., Franklin, R. C., & Franklin, R. C. (2024). *A focus on sex differences in drowning deaths in Australia: the need for reporting on sex and gender in drowning research*. *Journal of Public Health*, 32(9), 1797–1814. <https://doi.org/10.1007/s10389-023-01931-3>
- Sacher, P. M., Kolotourou, M., Chadwick, P. M., Cole, T. J., Lawson, M. S., Lucas, A., & Singhal, A. (2009). *Randomized Controlled Trial of the MEND Program: A Family-based Community Intervention for Childhood Obesity*. *Obesity*, 18(n1s), S62–S68. <https://doi.org/10.1038/oby.2009.433>
- Sawicki, Z. (2020). *Original Article Selected socio-economic factors influencing swimming competency of secondary school students*. 20(4), 1666–1672. <https://doi.org/10.7752/jpes.2020.04226>
- Shuai, Z. (2020). *Accepted Article*. <https://doi.org/10.1002/cjoc.202000226>
- Sundan, J., & Haga, M. (2024). *Swimming competence of 9 – 10-year-old Norwegian primary school children: A cross-sectional study of physical education*. 1–17. <https://doi.org/10.1177/1356336X241246521>
- Swenson, D. M., Collins, C. L., Fields, S. K., & Comstock, R. D. (2013). *Epidemiology of US High School Sports-Related Ligamentous Ankle Injuries, 2005 / 06 – 2010 / 11*. 43205, 190–196.
- Tang, K., Chang, C., & Hwang, G. (2021). *Trends in artificial intelligence-supported e-learning: a systematic review and co-citation network analysis (1998 – 2019)*. *Interactive Learning Environments*, 0(0), 1–19. <https://doi.org/10.1080/10494820.2021.1875001>
- Van Der Rowe. (2023). *Assessing University Students' Abilities and Challenges While Learning to Swim*. 8–18. <https://doi.org/10.32996/jspes>
- Wen, S., Tan, Q., Baheti, R., Wan, J., Yu, S., Zhang, B., & Huang, Y. (2024). *Heliyon Bibliometric analysis of global research on air pollution and cardiovascular diseases: 2012 – 2022*. *Heliyon*, 10(12), e32840. <https://doi.org/10.1016/j.heliyon.2024.e32840>
- Willcox-pidgeon, S. M., Peden, A. E., & Scarr, J. (2020). *Exploring children's participation in commercial swimming lessons through the social determinants of health*. March, 1–10. <https://doi.org/10.1002/hpja.335>
- Wróblewski, J. (2024). *The impact of swimming and other aquatics on human development, physiology, and the course of some diseases*. *Quality in Sport*. 2024;16:52504. eISSN 2450-3118. 0–3.
- Yadolahzadeh, A. (2020). *The role of mental imagery and stress management training in the performance of female swimmers*. 3, 1–11.
- Yubo, S., Ramayah, T., Hongmei, L., & Yifan, Z. (2023). *Heliyon Analysing the current status, hotspots, and future trends of technology management: Using the WoS and scopus database*. *Heliyon*, 9(9), e19922. <https://doi.org/10.1016/j.heliyon.2023.e19922>
- Zafar, M., Butt, I., Abdul, M., Abdul, M., & Adnan, J. (2024). *Migration Letters Benefits Of Swimming On Daily Life Of A University Students: Benefits Of Swimming On Daily Life Of A University Students: An Exploratory Study*. June.
- Zhang, G., & Liu, X. (2024). *ORIGINAL THE IMPACT OF SWIMMING TRAINING ON PHYSIOLOGICAL AND PSYCHOLOGICAL INDICATORS IN INDIVIDUALS OF DIFFERENT AGE GROUPS: A CROSS-SECTIONAL STUDY*. 24, 164–181.
- Zhu, G., Chen, K., Ling, C., Zhao, P., & Guo, L. (2023). *The Impact of Physical Activity on Cognitive Function in Children and Adolescents with Intellectual Disabilities: A Meta-Analysis*. *International Journal of Human Movement and Sports Sciences*, 11(6), 1253–1265. <https://doi.org/10.13189/saj.2023.110609>