

Sport Education Technology: Development Trends

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Abstract

The main purpose of this study is to analyze the publications on sport education technology from a bibliometric perspective. Although sport education technology draws attention as a rapidly developing field in the intersection between education and sport sciences, there are deficiencies in the bibliometric analysis of research in this field. Therefore, this research is an original study that analyzes the publications in the field of sport education technology with bibliometric analysis method. With this bibliometric study, parameters such as the development, research areas, international collaborations, etc. of publications titled sports education technology in the Web of Science (WoS) database were examined comprehensively. Therefore, the research aims to provide important contributions to academic studies on sport education technology and emphasizes the need for a more in-depth examination of trends in this field for future studies. The results reveal that countries such as China, Russia and Turkey play an important role in sports education technology and that there are widespread collaborations between these countries. In addition, it was observed that most of the studies were published in English, and it was concluded that this situation provides a significant advantage in terms of international access.

Keywords: Bibliometrics, Sports Education Technology, Web of Science

Introduction

The concept of sport is defined as a kind of physical and intellectual movement that individuals perform of their own free will, with the reflection of dominant values and norms (Gökdağ et al., 2019). Sports are competition activities organized by branch, where physical and mental competition takes place within the framework of certain rules. Therefore, sport is an activity that enables individuals to reach a high level of performance; this process includes not only technical and tactical development, but also the development of physical, physiological, mental and psychological elements (Yılmaz, 2023a; Yılmaz, 2023b; Yılmaz and Daşkesen, 2024). Considering that human education starts with play, orientation to sports is very important in terms of leading a healthy life (Türkmen and Varol, 2015). Considering the social effects of the concept of sport, it is one of the biggest impact factors in the world in terms of health, culture and bringing people together. With the spread of modern sports, it has become a situation that has become a point of interest for people all over the World (Alaeddinoğlu, 2024). Especially with the development of technology, it has become one of the universal concepts of people in the World (Aydın and Aydın, 2024). All these situations lead to important innovations in sports sciences due to advances in technology (Yılmaz, 2022). Today, in order to achieve success and quality in the field of sports, both theoretical and practical sports education gains importance with the effective use of technologies (Bekar and Türkmen, 2023). With the introduction of smart devices into our lives, there have been significant changes in sports education (Aydın and Belli, 2022). Since health is considered to be the sine qua non condition of quality life, reducing the intensity of daily activity with technological developments, although it makes life easier, increases the number of inactive individuals in the long run and negatively affects health. Inactivity, i.e. sedentary life, is one of the most important problems for modern society, which realizes even its daily shopping from virtual markets on the computer (Bozkuş et al., 2013). Therefore, the effects of globalization on the business world today require vocational and technical training of manpower, which is the most important resource for organizations, businesses and societies (Özbek et al., 2021). Computer technology offers a different learning environment, introducing other types of learning and facilitating new methods. In this way, it increases the interest of students and athletes in acquiring skills and knowledge (Zhou, 2016). The modernization of computer technology in physical education and sport has enabled teachers to deliver better and more attractive lessons using digital technology. In this way, students' engagement increases and learning processes become more effective. Moreover, the integration of technology provides new opportunities for teachers to monitor and evaluate students' performance. This contributes to the development of athletes' abilities and a more efficient education (Koh et al., 2020; Cojocararu et al., 2022).

Sport education technology occupies an important place at the intersection of sport sciences and education. Research in this field covers topics such as the integration of technology in education, methods to improve sport performance, and the development of training materials. This study aims to examine publications on sport education technology from a bibliometric perspective.

Although sport education technology draws attention as a rapidly developing field in the intersection between education and sport sciences, there are deficiencies in the bibliometric analysis of research in this field. This research is thought to provide guidance for future research by analyzing existing publications and citations and providing important data to understand the development of the field. In addition, this study will contribute to increasing the visibility of publications on sport education technology, encouraging academic productivity and determining which topics attract more attention and which areas need more

research by providing important information for educational institutions and researchers to make strategic decisions. In addition, it is thought that it will enable more comprehensive and effective research in the field of sport education technology by encouraging collaborations between researchers from different disciplines.

This research is an original study that analyzes publications in the field of sport education technology with bibliometric analysis method. At the same time, it provides an understanding of the global and local dynamics of sport education technology by addressing various dimensions such as the content of publications, authors' countries and collaborations, which makes this study unique. At this point, it is thought that this study will be a valuable reference source for future research while making an important contribution to the sport education technology literature.

Material and Method

For the research, a total of 73 articles published in the Web of Science database under the title of sport education technology were examined by bibliometric analysis method through Sankey diagram, Bibliometrix-R package and VOSviewer programs. The concept of bibliometrics, which is accepted to have been used for the first time by Pritchard, is explained as the statistical analysis of data including publications such as books, journals, articles and theses accessed from various databases (Saymer, 2023). Bibliometric studies contribute by providing authors with the most basic information about their field of study and help to provide insights into their perspective on the field (Karaca, 2024). Bibliometric analysis examines the evolution of scientific studies and the shaping processes of the literature, revealing the evolution of publications in a given research area over time, the contributions of researchers and countries, main themes and trends (Yılmaz and Dertli, 2024a). By providing a comprehensive visibility of scientific knowledge, this methodology contributes to understanding the evolution and future development directions of the research field (Yılmaz and Dertli, 2024b).

The following search text was used in the title (TI) field in the Web of Science database: (((TI=(Sport*and Technology*and Education*)) OR TI=(Sport Technology Education)) OR TI=(Sport Technology Education)) OR TI=(Sport* Technology* Education)). An advanced search with these keywords was used to identify publications covering the relevant topic. In the selection of publications, we focused only on studies with links to these terms in their titles and excluded studies that were not directly related to the topic. However, no restrictions were made in terms of factors such as year of publication, type of publication (article, journal, thesis, etc.). This study was limited to a search in the Web of Science database. Therefore, Scopus, Google Scholar and other databases are not included in this analysis. The software tools used in the analysis (Sankey diagram, Bibliometrix-R package and VOSviewer) are reliable and widely accepted verifiable tools for this type of analysis (Yılmaz, 2024). This software was effectively used to visualize the relationships between publications, authors, keywords and countries (Aria and Cuccurullo, 2017). All analyses were rigorously reviewed and based on verifiable data to ensure transparency and reproducibility of the study.

Criteria such as citation distribution, open access status, author countries and keyword analysis were analyzed. At this point, the questions sought to be answered in the study are as follows;

How does the citation report show the distribution?

How are citations and publications over time distributed?

How is the distribution of Web of Science index?

How are research areas distributed?

How is the distribution of Web of Science categories?

How is open access distributed?

What is the distribution of publication language?

How are corresponding author's countries distributed?

How is the citation of countries distributed?

How is the distribution of countries' collaboration world map?

How does co-occurrence author keywords show distribution?

How does the three-field plot show distribution?

How do titles according to trending topics show distribution?

How do abstracts according to trending topics show distribution?

How do keywords plus according to trending topics distribute?

How is the distribution of author's keywords according to trending topics?

How is the distribution of frequency of words over time in titles?

Findings

In this section, the findings of the studies on sport technology education are presented. In the advanced search section of the Web of Science database, as a result of a search of a total of 2,510 studies in the TS (title, abstract, keyword plus and author keywords) field, only 73 studies containing the term (Sport Technology Education) in the title were filtered. At this point, as in Aydoğan, (2024), Ertan, (2024), Karataş and Karataş, (2024), Gültekin and Korkmaz, (2024), the reason for focusing only on title (TI) data is that titles are the sections that provide the most direct reference to the topic and reflect the main trends in the literature most accurately. Since titles are the elements that most clearly express the subject of a study, focusing on this area provides a clearer picture of the main themes in the literature, the main trends and new developments in the research area. Therefore, the choice of title (TI) data makes it possible to comprehensively analyze the literature and more accurately reflect the evolution of a particular field. In this context, studies with the word “Sport Technology Education” in the title were selected using the Web of Science database. This selection process was meticulously carried out in order to increase the accuracy of the analysis and to ensure that the data obtained best reflects the important themes of the field. The selected keywords provide in-depth information about the key issues and trends of this research and more clearly illustrate the evolution of the literature in the field.

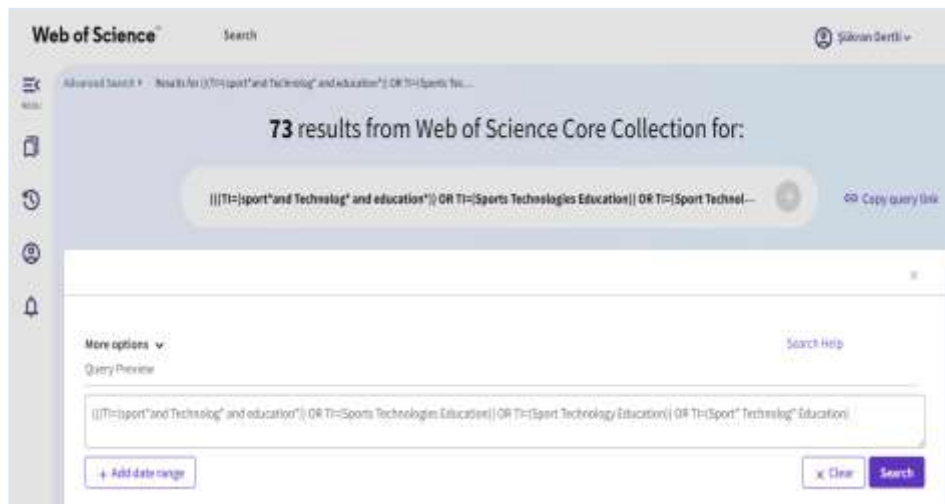


Figure 1. Citation report

In Figure 1, it is seen that data analysis was realized with 73 publications titled sport education technology.

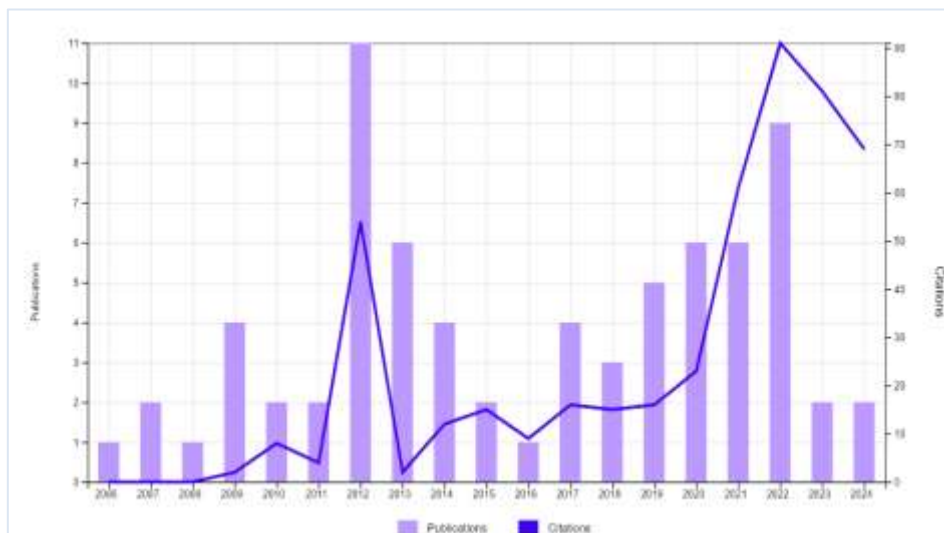


Figure 2. Distribution of citations and publications over time

Figure 2 shows that the publications titled sport education technology were prepared between 2006 and 2024. The findings obtained for these publications are as follows; 2006 (citation:0, publications:1), 2007 (citation:0, publications:2), 2008 (citation:0, publications:1), 2009 (citation:2, publications:4), 2010 (citation:8, publications:2), 2011 (citation:4, publications:2). 2012 (citation:54, publications:11), 2013 (citation:2, publications:6), 2014 (citation:12, publications:4), 2015 (citation:15, publications:2), 2016 (citation:9, publications:1), 2017 (citation:16, publications:4), 2018 (citation:15, publications:3). 2019 (citation:16, publications:5), 2020 (citation:23, publications:6), 2021 (citation:61, publications:6), 2022 (citation:91, publications:9), 2023 (citation:81, publications:2), 2024 (citation:69, publications:2).

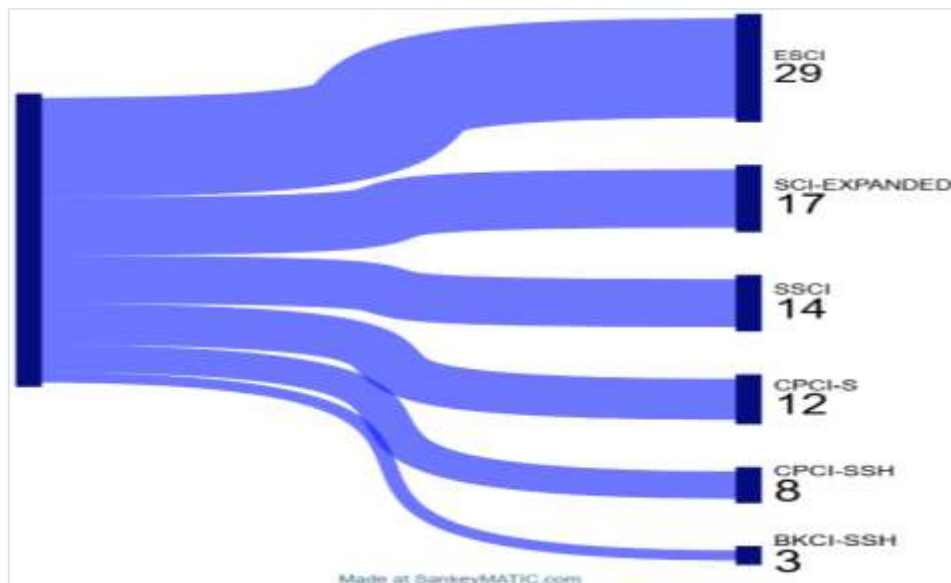


Figure 3. Distribution of Web of Science index

In Figure 3, it was found that the Web of Science indexes of the publications titled sport education technology were “ESCI (record count:29)”, “SCI-EXPANDED (record count:17)”, “SSCI (record count:14)”, “CPCI-S (record count:12)”, “CPCI-SSH (record count:8)”, “BKCI-SSH (record count:3)”.

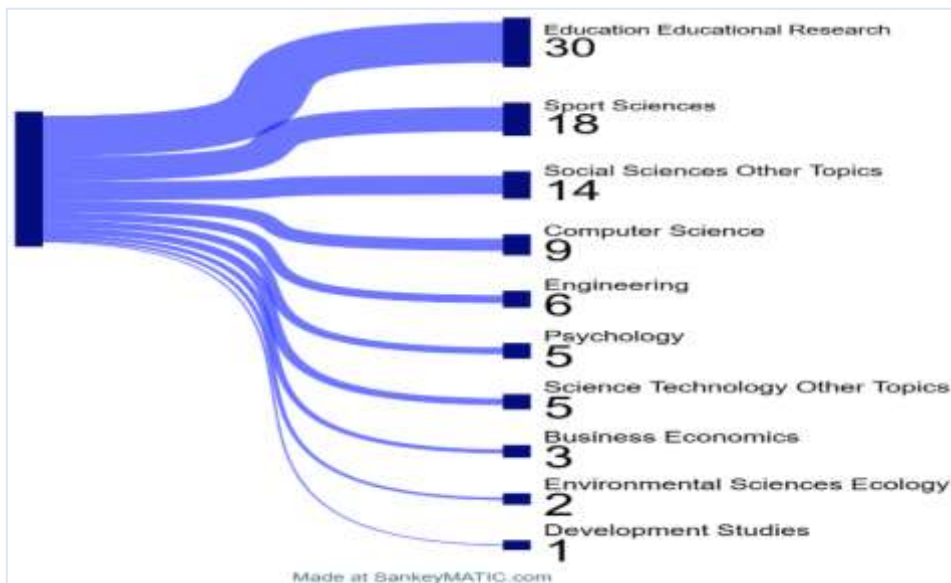


Figure 4. Distribution of research areas

In Figure 4, it is found that the research fields in the top 10 of the publications titled sport education technology are “education educational research (record count:30)”, “sport sciences (record count:18)”, “social sciences other topics (record count:14)”, “computer science (record count:9)”, “engineering (record count:6)”, “psychology (record count:5)”, “science technology other topics (record count:5)”. “business economics (record count:5)”, “environmental sciences ecology (record count:2)”, “development studies (record count:1)”.

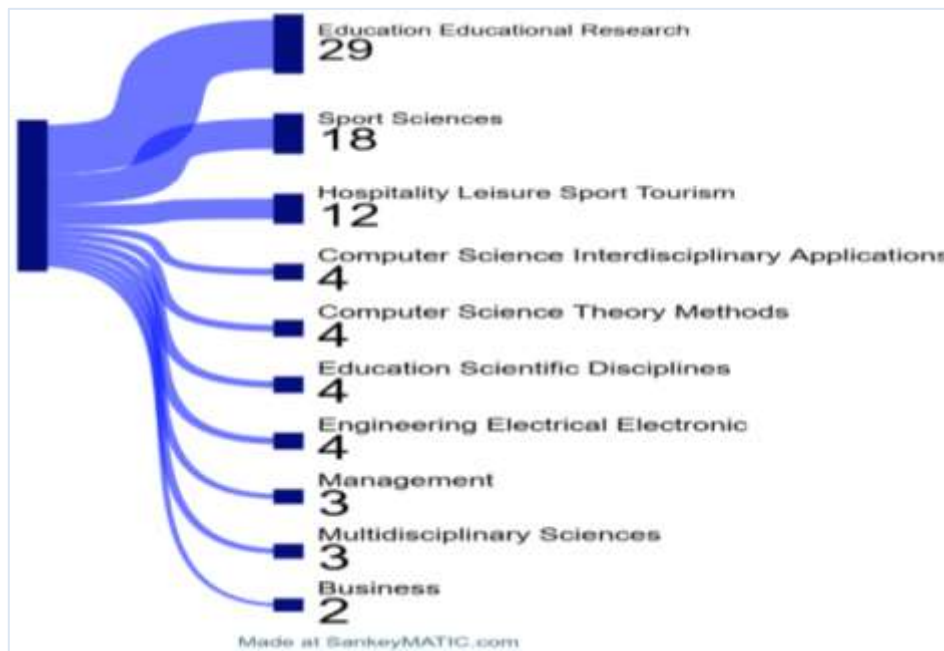


Figure 5. Distribution of Web of Science categories

Figure 5 shows that the top 10 Web of Science categories of publications titled sport education technology are “education educational research (record count:29)”, “sport sciences (record count:18)”, “hospitality leisure sport tourism (record count:12)”, “computer science interdisciplinary applications (record count:4)”, “computer science theory methods (record count:4)”. “education scientific disciplines (record count:4)”, engineering electrical electronic (record count:4)”, “management (record count:3)”, “multidisciplinary sciences (record count:3)”, “business (record count:2)”

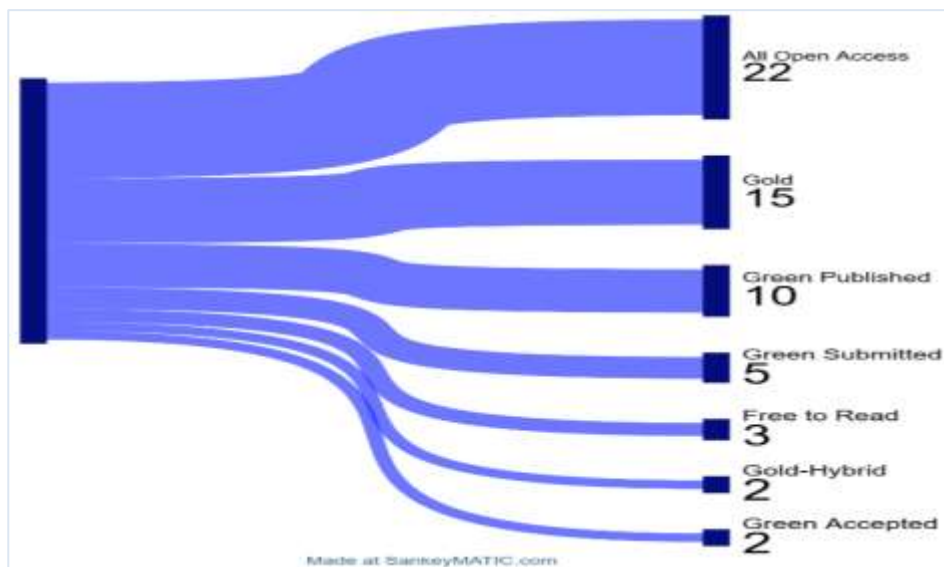


Figure 6. Distribution of open access

Figure 6 shows that the open access status of the publications titled sport education technology is “all open access (record count:22)”, “gold (record count:15)”, “green published (record count:10)”, “green submitted (record count:5)”, “free to read (record count:3)”, “gold-hybrid (record count:2)”, “green accepted (record count:2)”.

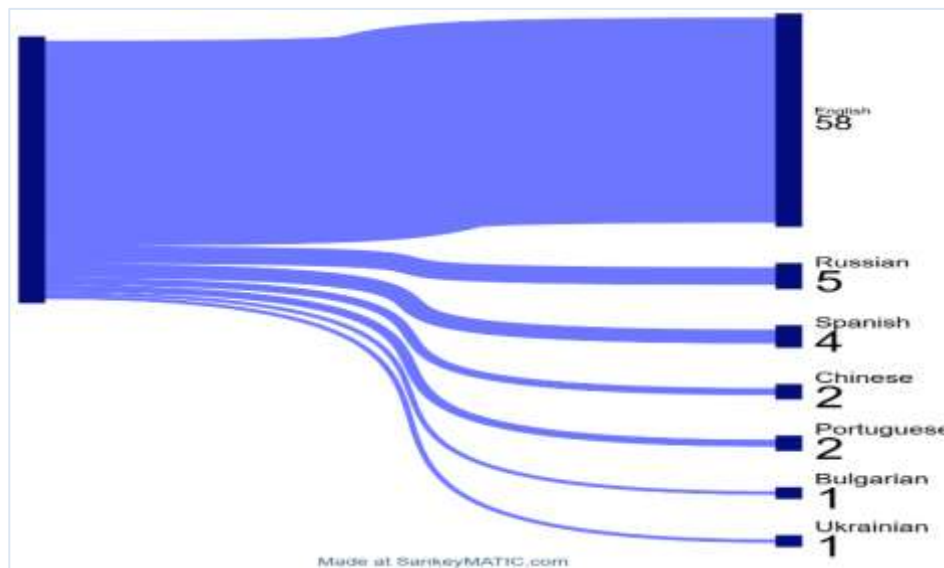


Figure 7. Distribution of languages

Figure 7 shows that the publication languages of the studies on sports education technology are “English (record count:58)”, “Russian (record count:5)”, “Spanish (record count:4)”, “Chinese (record count:2)”, “Portuguese (record count:2)”, “Bulgarian (record count:1)”, “Ukrainian (record count:1)”.

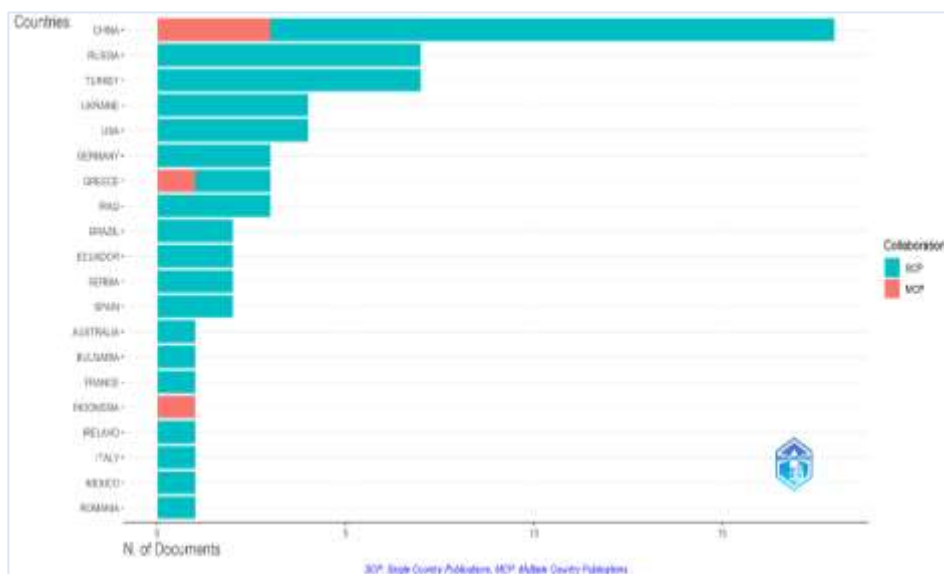


Figure 8. Distribution of corresponding author's countries

Figure 8 shows that the top 10 countries of the corresponding authors of the publications with the title of sport education technology are “China (articles:18, articles%:24.7, SCP:15, MCP:3, MCP%:16.7)”, “Russia (articles:7, articles%:9.6, SCP:7, MCP:0, MCP%:0)”, “Turkey (articles:7, articles%:9.6, SCP:7, MCP:0, MCP%:0)”. “Ukraine (articles:4, articles%:5.5, SCP:4, MCP:0, MCP%:0)”, “Usa (articles:4, articles%:5.5, SCP:4, MCP:0, MCP%:0)”, “Germany (articles:3, articles%:4.1, SCP:3, MCP:0, MCP%:0)”, “Greece (articles:3, articles%:4.1, SCP:2, MCP:1, MCP%:33.3)”. “Iraq (articles:3, articles%:4.1, SCP:3, MCP:0, MCP%:0)”, “Brazil (articles:2, articles%:2.7, SCP:2, MCP:0, MCP%:0)”, “Ecuador (articles:2, articles%:2.7, SCP:2, MCP:0, MCP%:0)”.

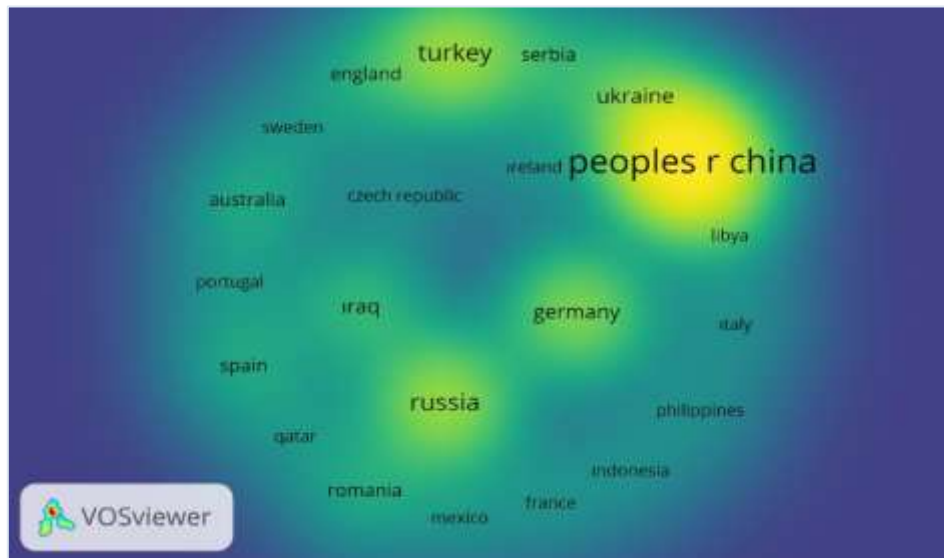


Figure 9. Distribution map of most cited countries

Figure 9 shows that the top 10 cited countries of the publications titled sport education technology are “Australia (citations:139)”, “Indonesia (citations:138)”, “Turkey (citations:78)”, “Greece (citations:68)”, ”Peoples R China (citations:62)”. “England (citations:36)”, “Russia (citations:28)”, “Phillipines (citations:24)”, “Ukraine (citations:19)”, “Czech Republic (citations:14)”.

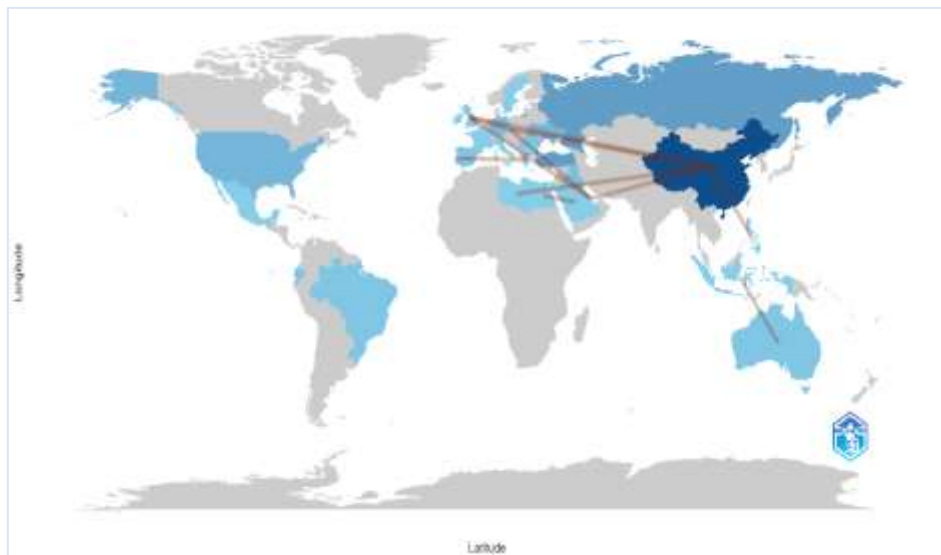


Figure 10. Distribution of countries' collaboration world map

Figure 10 shows that the publications with the title of sport education technology are “China and Czech Republic (frequency:1)”, “China and Libya (frequency:1)”, “China and Phillipines (frequency:1)”, “China and Qatar (frequency:1)”. “China and United Kingdom (frequency:1)”, “Czech Republic and Qatar (frequency:1)”, “Egypt and Saudi Arabia (frequency: 1)”, “Greece and Portugal (frequency: 1)”. “Indonesia and Australia (frequency:1)”, “United Kingdom and Czech Republic (frequency:1)”, “United Kingdom and Qatar (frequency:1)”.

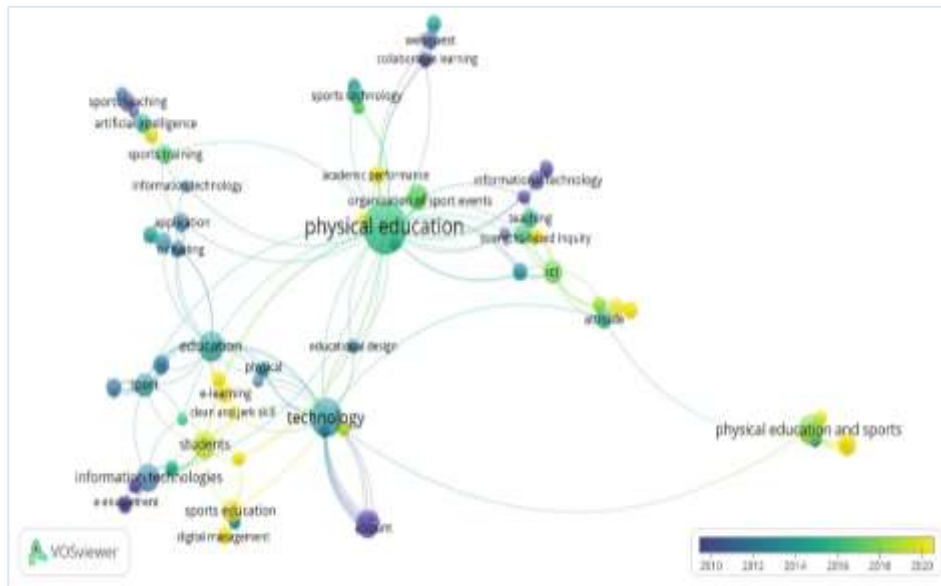


Figure 11. Distribution of co-occurrence author keywords

In Figure 11, the co-author keywords in the top 10 of 154 items, 17 clusters, 438 links and 451 total link strength publications titled sport education technology are as follows: “Physical education (occurrences: 15, total link strength: 50)”, “technology (occurrences: 8, total link strength: 30)”, “education (occurrences: 5, total link strength: 21)”. “physical education and sports (occurrences: 5, total link strength: 16)”, “information technologies (occurrences: 4, total link strength: 15)”, “students (occurrences: 4, total link strength: 15)”. “sport (occurrences: 3, total link strength: 15)”, “ict (occurrences: 3, total link strength: 15)”, “sports education (occurrences: 3, total link strength: 11)”, “motivation (occurrences: 2, total link strength: 10)”.

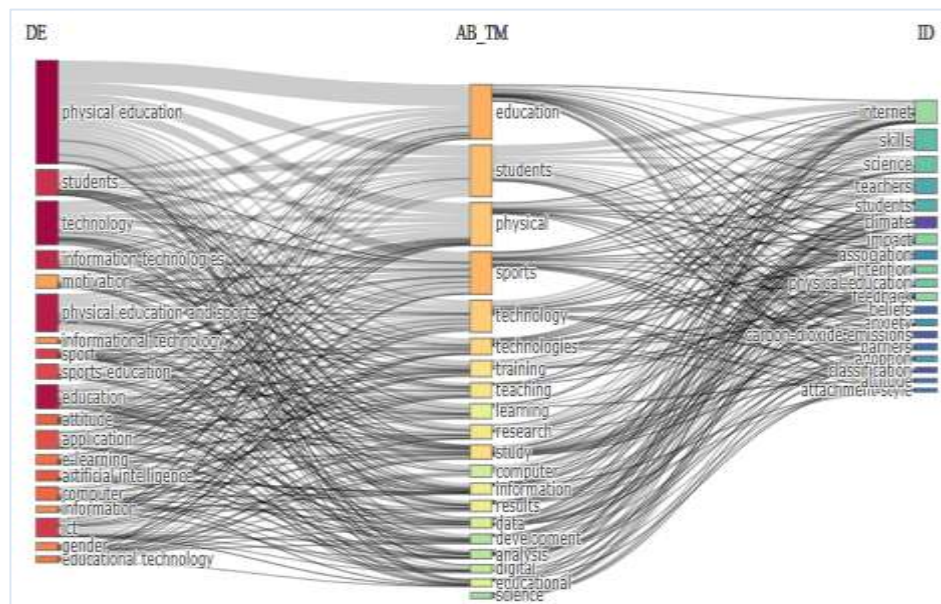


Figure 12. Distribution of three-field plot

In the three-field plot distribution created with abstract, keywords and keywords plus in Figure 12, it was found that sports education and technology are integrated with each other.

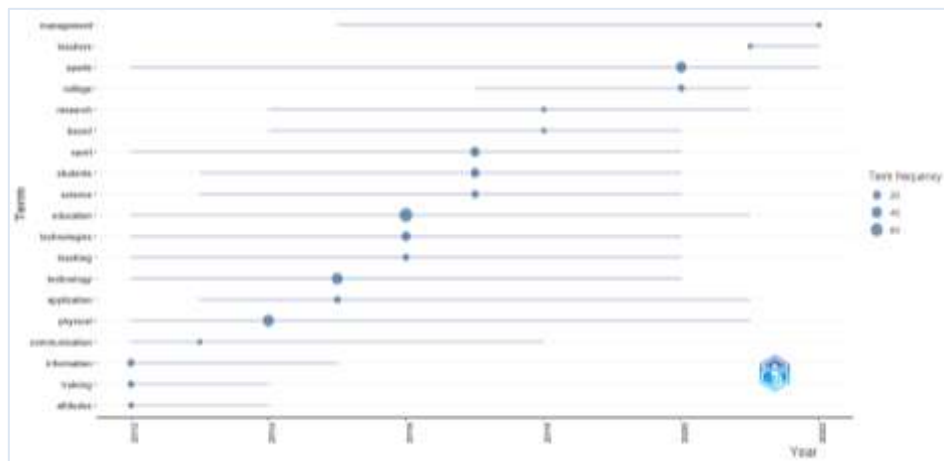


Figure 13. Distribution of titles according to trending topics

Figure 13 shows that the trending topics of the titles in the top 10 of the publications titled sport education technology are “education (frequency:76, year(Q1):2012, year(median):2016, year(Q3):2021)”, “physical (frequency:46, year(Q1):2012, year(median):2014, year(Q3):2021)”, “technology (frequency:43, year(Q1):2012, year(median):2015, year(Q3):2020)”. “sports (frequency:40, year(Q1):2012, year(median):2020, year(Q3):2022)”, “sport (frequency:27, year(Q1):2012, year(median):2017, year(Q3):2020)”,

“Technologies (frequency:26, year(Q1):2012, year(median):2016, year(Q3):2022)”, “students (frequency:24, year(Q1):2013, year(median):2017, year(Q3):2020)”. “information (frequency:12, year(Q1):2012, year(median):2012, year(Q3):2015)”, “science (frequency:11, year(Q1):2013, year(median):2017, year(Q3):2020)”, “application (frequency:9, year(Q1):2013, year(median):2015, year(Q3):2021)”.

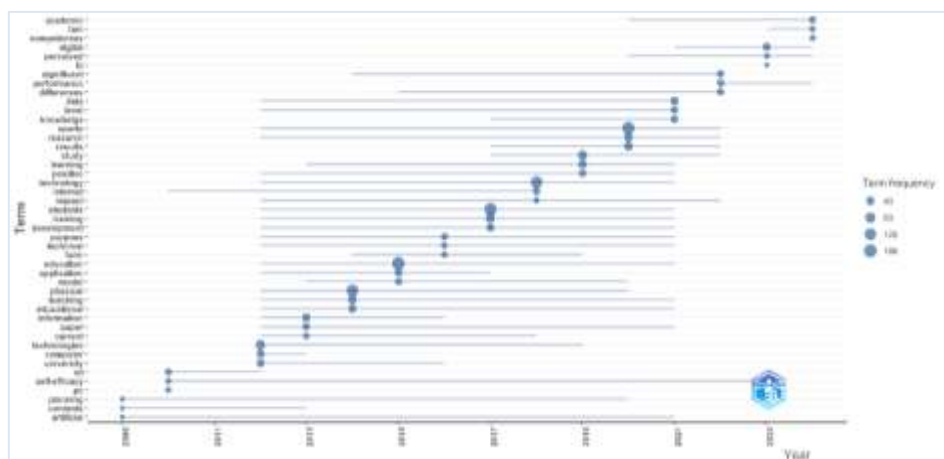


Figure 14. Distribution of abstracts according to trending topics

Figure 14 shows that the trending topics of the abstracts in the top 10 of the publications titled sport education technology are “education (frequency:162, year(Q1):2012, year(median):2015, year(Q3):2021)”, “sports (frequency:146, year(Q1):2012, year(median):2020, year(Q3):2022)”, “students (frequency:131, year(Q1):2012, year(median):2017, year(Q3):2021)”.

“Physical (frequency:127, year(Q1):2012, year(median):2014, year(Q3):2020)”, “technology (frequency:117, year(Q1):2012, year(median):2018, year(Q3):2021)”, “technologies (frequency:60, year(Q1):2012, year(median):2012, year(Q3):2019)”, “study (frequency:55,

year(Q1):2017, year(median):2019, year(Q3):2022)”. “training (frequency:50, year(Q1):2012, year(median):2017, year(Q3):2021)”.

“Teaching (frequency:44, year(Q1):2012, year(median):2014, year(Q3):2021)”, “research (frequency:43, year(Q1):2012, year(median):2020, year(Q3):2022)”.

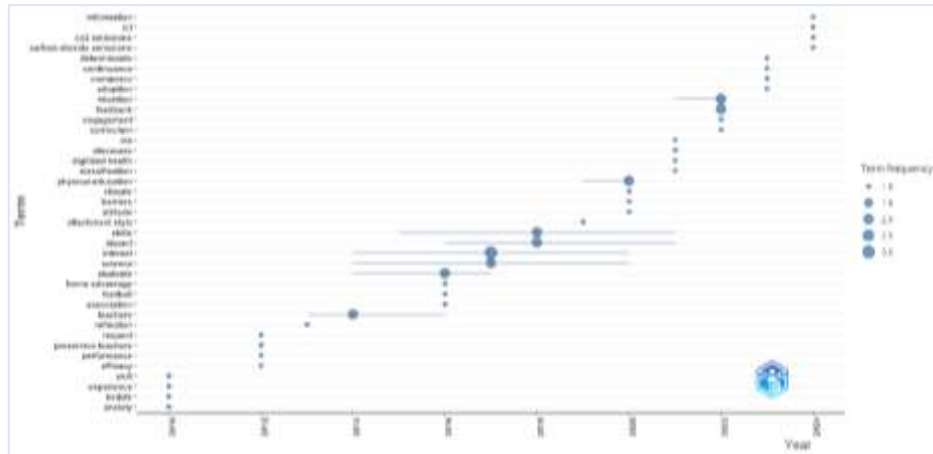


Figure 15. Distribution of keywords plus according to trending topics

Figure 15 shows that the Keywords plus trending topics in the top 10 of the publications titled sports education technology are “internet (frequency:3, year(Q1):2014, year(median):2017, year(Q3):2020)”, “teachers (frequency:2, year(Q1):2013, year(median):2014, year(Q3):2016)”, “students (frequency:2, year(Q1):2014, year(median):2016, year(Q3):2017)”, “science(frequency:2, year(Q1):2014, year(median):2017, year(Q3):2020)”. “impact (frequency:2, year(Q1):2016, year(median):2018, year(Q3):2021)”, “skills (frequency:2, year(Q1):2015, year(median):2018, year(Q3):2021)”, “physical-education (frequency:2, year(Q1):2019, year(median):2020, year(Q3):2020)”, “feedback (frequency:2, year(Q1):2022, year(median):2022, year(Q3):2022)”. “intention(frequency:2, year(Q1):2021, year(median):2022, year(Q3):2022)”, “anxiety (frequency:1, year(Q1):2010, year(median):2010, year(Q3):2010)”.

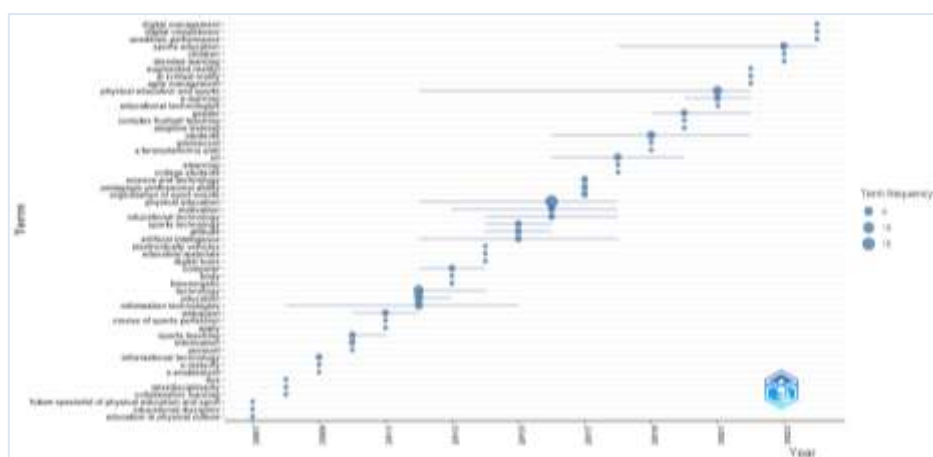


Figure 16. Distribution of author's keywords according to trending topics

Figure 16 shows that the author's keywords in the top 10 of the publications with the title “physical education (frequency:15, year(Q1):2012, year(median):2016, year(Q3):2018)”, “technology (frequency:8, year(Q1):2012, year(median):2012, year(Q3):2014)”, “education

(frequency:5, year(Q1):2012, year(median):2012, year(Q3):2013)”, “physical education and sports (frequency:5, year(Q1):2012, year(median):2021, year(Q3):2022)”,

“Information technologies (frequency:14, year(Q1):2008, year(median):2012, year(Q3):2015)”, “students (frequency:4, year(Q1):2016, year(median):2019, year(Q3):2022)”, “ict (frequency:4, year(Q1):2016, year(median):2018, year(Q3):2020)”. “sports education (frequency:3, year(Q1):2018, year(median):2023, year(Q3):2024)”, “informational technology (frequency:2, year(Q1):2009, year(median):2009, year(Q3):2009)”, “information (frequency:2, year(Q1):2010, year(median):2010, year(Q3):2010)”.

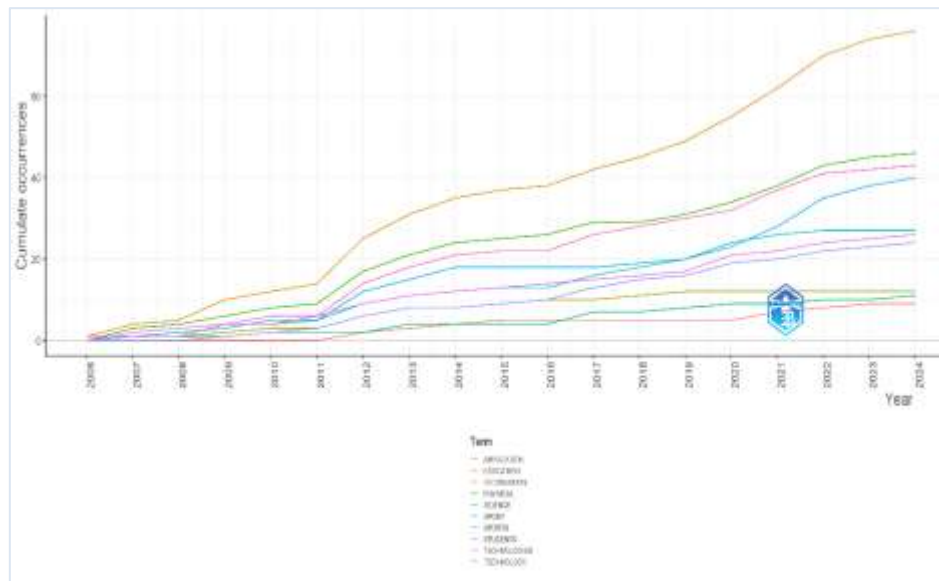


Figure 17. Frequency of words over time in titles

Figure 17 shows that the word frequency of the publications titled sport education technology increased after 2009.

Discussion and Conclusion

In this study, academic trends in the field of sport education technology are analyzed and gaps in the literature are revealed. There are some significant gaps in the literature on how technology can be used effectively in teaching processes and how pedagogical models can adapt to this technology integration. Sospedra Harding et al. (2020) emphasized that technology integration in physical education teaching should develop in line with pedagogical models. The study revealed that teachers and students need more training and development in the integration of digital tools and technologies into physical education lessons. The researchers stated that technology integration in education contributes to important issues such as combating physical inactivity and developing physical education skills. In this context, it is emphasized that supporting pedagogical approaches and teaching methodologies with digital tools is critical. However, more research on the alignment of technology integration in education with pedagogical models is needed and in-depth analyses of how technology use contributes to different aspects of education (learning, teaching, student engagement) are lacking. There are some important areas in the literature that could fill these gaps. More quantitative and qualitative studies are needed on teachers' attitudes towards digital tools and how these tools can be integrated into teaching methodologies. In addition, the number of studies evaluating the effectiveness of technology-supported learning processes should be increased. It can be stated that technology integration in education should be

emphasized more on its integration with pedagogical approaches and teaching methodologies by going beyond just an instrumental dimension. It is suggested that multidisciplinary research should be encouraged in how these literature gaps can be filled in future studies. Including more studies from different fields such as educational technologies, sport sciences and instructional sciences will increase the body of knowledge in this field and reveal more effective ways of technology integration in education. In particular, it is important to examine teachers' experiences in interacting with digital tools and analyze how pedagogical models align with these experiences. In conclusion, it can be stated that there is a need for more in-depth analysis on the relationship of technology integration with pedagogical models in studies conducted in the field of sport education technology, and these gaps should be filled in future research. Expanding the research in this field can enable both teachers and students to get more efficiency from the educational processes and contribute to the use of technology in education to become more effective.

The findings of this study provide important clues about academic developments in the field of sport education technology and basic knowledge in the literature. The data obtained draws attention to the current situation in this field, as well as certain directions for further research. Below, the results of the study and recommendations based on this information are presented.

The data analysis of 73 publications on sport education technology shows that academic interest in this field is increasing. When the distribution of publications between 2006 and 2024 is analyzed, a significant increase is observed as of 2012. This shows that after 2012, there is an increased interest in academic studies in this field. Especially the high number of citations of the publications made in 2021 and 2022 reveals that the importance of sports education technology is increasing. In the study conducted by Saripek and Hacicaferoğlu (2024) on the concepts of physical education, sports education and disability, it was determined that most of the researches produced belonged to the year 2022 and the most citations belonged to the year 2024. It is seen that the majority of the publications are included in the “ESCI” index, followed by “SCI-EXPANDED” and “SSCI” indexes. This situation indicates that studies in the field of sport education technology have started to be recognized on the international platform. Yılmaz (2024) compared the effects of artificial intelligence and metaverse technologies in the field of Sports and Recreation, and found that the studies produced were mostly included in SCI-EXPANDED, SSCI and ESCI indexes. The findings obtained are in parallel with the findings obtained from this study.

It is seen that fields such as education and educational research, sports sciences, social sciences, computer sciences are intensively included in Web of Science categories. Therefore, it was concluded that educational research forms the basis of studies on sport education technology. This situation emphasizes the close relationship of sport education technology with both education and sport sciences. In all of these, it reveals that sports education technology is integrated with education. These findings are in line with the findings of Baytur and Ulaş's (2022) study in the field of sports education.

Open access publications play an important role in increasing access to academic knowledge. Therefore, the high rate of open access publications increases the accessibility of information in this field and contributes to the dissemination of research. The fact that the majority of the publications are in English facilitates international access, while publications in languages such as Russian and Spanish show the interest in certain regions. The fact that China is the country that produces the most articles among the countries of the authors shows that academic studies in this field are concentrated in Asia. It is noteworthy that Turkey also has a significant share. The fact that Australia and Indonesia are among the most cited countries

reveals that these countries host important studies in sport education technology. Collaborations between countries are especially concentrated between China and other countries; this situation reveals that international cooperation and information sharing is increasing. This may be related to the national policies and investment priorities of these countries. China is thought to have invested heavily in sports and educational technologies in recent years. Similarly in Turkey, the growing interest in the development of physical education and sports technology may be supported by local policies and government-sponsored projects. It can also be argued that the cultural emphasis on the positive effects of sport on public health in these countries has increased interest in sport education technologies. China's emphasis on international collaborations may also have been instrumental in increasing the number of publications in this field by establishing strong links with the global academic community. In conclusion, this intensive production of publications in the field of sport education technology may be a reflection not only of national policies and investments, but also of cultural factors and international collaborations.

The co-occurrence of keywords clearly reveals the main themes and relationships of the studies on sport education technology. The use of keywords such as "physical education", "technology", "education" with high frequencies clearly reveals the themes that the studies focused on. In the three-field distribution created with "abstract", "keywords" and "keywords plus", the existence of the integration of sport education and technology is seen. Therefore, the three-field distribution reveals that the integration of sport education and technology is increasing. In all these cases, it is thought that it will form an important basis for future research. Topics such as education, physical education and technology constitute the main themes of the studies in this field. In this respect, the frequent occurrence of the words "education" and "sports" in the titles and abstracts of publications reveals that these fields are gaining more and more importance and research is concentrated in this direction.

Similarly, in the distribution of key topics, it is seen that key concepts such as "education" and "sports" have a high frequency. This reflects the increasing importance of technology in the field of sport education and how educational methodologies are shaped in this context. In particular, the frequency of "physical" and "technology" emphasizes the integration of technological innovations in sport education. Moreover, the presence of concepts such as "training" and "teaching" reveals how critical the technological tools used in teaching processes are for educators. The inclusion of concepts such as "internet" in the keyword trends indicates the role of digitalization in sport education. It is understood that the studies show a trend in how they adopt online educational applications and interactive platforms. Furthermore, the frequency of the words "teachers" and "students" provides important clues on how these studies influence the interaction between educators and students. The author's keywords likewise reveal the concentration of specific topics. The prominence of words such as "physical education" and "technology" indicate the main focal points in this field. In particular, the concept of "information technologies" reflects the prevalence of studies investigating the role of technology in education. The frequency of keywords over time shows an increase, especially after 2009. This indicates the development trends of sport education technology and the expansion of the research field. The trend words analyzed show that education and sport are at the forefront. These trends provide important guidance for future research.

Development trends in the field of sport education technology significantly influence educational approaches and research topics. It was concluded that "data analytics", "performance monitoring", "gamified learning", "multidisciplinary approaches", "student-centered education", "digitalization and online education" are the main development trends in

this field. These development trends in sport education technology show that the field is evolving dynamically. Educators and researchers should take these trends into account and update their educational methods and content to provide more effective and engaging learning experiences. In the future, it is expected that these trends will deepen further and major transformations will occur in the field of sport education with the integration of new technologies. Overall, this bibliometric study on sport education technology clearly reveals the dynamics and changing trends of the field. As the role of technology in education is increasing, it is expected that research on this subject will also diversify. Educators and researchers aiming to develop and implement more effective training methods using this data will increase the impact of technology in sport education. In the future, a more multidisciplinary approach to this field may contribute to the evolution of sport education technology. This bibliometric study reveals the current situation in the field of sport education technology. However, in order to further deepen and develop research in this field, the following suggestions can be made: Longer-term and comprehensive analyses of studies on sport education technology should be conducted. In this way, the evolution of trends over time can be better understood. Sport education technology is influenced by various disciplines. More interdisciplinary studies in fields such as education, sport science, engineering and psychology should be encouraged. In addition to quantitative data, an emphasis on qualitative research can provide more in-depth information about the applications and impacts of sport education technology.

Previous studies in the field of sport education technology have generally focused on technology integration and pedagogical models. However, there are limited studies in the literature on how technology integration can be more effectively combined with pedagogical methods. Although most of the existing studies address the applicability of sport education technologies and their integration into teaching processes, there are still gaps in how teachers and students can use these technologies more efficiently. To address these gaps, more quantitative and qualitative research on the integration of teaching methods and pedagogical models with technology is needed. Future studies provide an important opportunity to expand the application areas of educational technologies and explore pedagogical innovations in the field of sport education in more depth. Furthermore, increasing multidisciplinary research reflecting the evolving trends of sport education technology will help to fill the gaps in the field. In this study, sport education, development area, academic advances are analyzed and the stages in the literature are revealed. This research is an original study that investigates publications in the field of sport education technology by bibliometric analysis method. As a result of the related literature review, there is no study that examines the bibliometric analysis of publications titled sports education technology in WoS, which reveals the originality of this study. It also provides an understanding of the global and local dynamics of sport education technology by addressing various dimensions such as the content of publications, authors' countries and collaborations. In this case, it is thought to be a valuable reference source by making a significant contribution to the sport education technology literature.

Qualitative studies on user experiences, teaching methods and technology integration should be included. Research examining the impact of sport education technology on education systems and sport policies should be conducted. This can strengthen the link between academic knowledge and practical applications. Inter-country collaborations can contribute to the exchange of knowledge and experience in the field of sport education technology. It is important to develop international projects and establish joint research networks. Given the rapidly changing nature of technology, proactive research should be conducted to identify future trends in sport education technology. The impact of innovative technologies such as

artificial intelligence, virtual reality and distance learning should be explored. Since this study conducted a bibliometric analysis of the publications titled sport education technology in WoS, a broader literature analysis can be made by examining the keywords in Ts (subject, abstract, keywords) in the future. These recommendations can contribute to the progress of research in the field of sport education technology in a more systematic and effective way. It is thought that future studies will help this field to better explore its potential and expand its application areas. Future studies could use quantitative methods such as network analysis or qualitative research methods such as case studies. Network analysis can be a useful approach to study collaborations and interactions between different countries. Case studies can be used to gain an in-depth understanding of the impacts of sport education technology in the context of specific schools, educational institutions or sport organizations. Furthermore, examining the potential impact of new technological developments, innovations such as artificial intelligence (AI) and virtual reality (VR), Metaverse technology on sport education can help us understand how research topics and teaching practices in this field will be shaped. These technologies can both increase interactivity in education and transform teaching methods. However, in terms of theoretical frameworks, the use of models such as social learning theory or technology acceptance model can be useful to study the integration of sport education technology into teaching processes. These theories can provide a basis for understanding the impact of technology on teaching methods. In conclusion, it is considered that future research should focus on a set of new methodological approaches and theoretical frameworks that will allow it to better explore new trends in the field of sport education technology, taking into account the rapidly changing nature of technology. This will contribute to advancing the field in a more systematic way and will be an important step to better explore the potential of sport education technology.

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