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Mapping Tendencies in Curriculum Research on Physical Education and Sports: A Bibliometric Analysis

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This study aims to investigate previous curriculum research on physical education and sports using the bibliometric mapping method. A systematic map was created for the research tendencies in physical education and sports curricula studies conducted between 1975 and 2021. Accordingly, the intention is to fill a gap in the literature by conducting a general situation analysis about the present status of curriculum studies in physical education and sports based on the publication and citation data obtained from the Web of Science (WoS) database. The software VOSviewer was utilised for the bibliometric analysis. After scanning the studies in the database, 454 studies were accessed at the initial stage. A total of 114 studies were covered in the analysis by following certain exclusion criteria. The findings suggested that curriculum studies in physical education and sports were conducted in association with numerous multidisciplinary research areas. Furthermore, in recent years, a linear increase in curriculum studies has occurred on this subject matter. It was also found that scientists from universities in the United States of America were at the centre of the studies. Another striking result was the limited number of journals specialising in sports and education. The results of the bibliometric maps also demonstrated that the researchers in this field investigated a variety of subjects that can be grouped under four main disciplines: ‘health and physical education,’ ‘curriculum reform,’ ‘contents,’ and ‘pre-service teachers.’ Addedl the results revealed that studies on physical education and sports curricula were conducted with a focus on current developments.

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Introduction

From the past to the present, education systems have often been designed to meet social expectations. The most fundamental purpose of education systems is to train qualified individuals. Each education system identifies the desired model to be developed in the light of its educational philosophy and human power policies while planning educational activities accordingly. The rational exploitation of human power resources occurs in line with the level of knowledge and education in almost every period (Abalı, 1974; Tutkun, 2010). While regulating educational policies, all societies organise these policies considering the needs by especially analysing the developments in science and technology in addition to other developments that affect education such as social, cultural, economic, political, and environmental variables. The most important regulating factor of this need in the education process is the educational curriculum that forms the basis of education systems. As the needs of society change, curricula also need to be updated in line with current conditions (Erden, 1998). Educational programs or curricula consist of the targeted objectives, the content to be taught, the teaching approaches and methods to be applied, the tools to be used, and the evaluation criteria to assess the achievement of the goals (Gözütok, 2003; Posner, 1995).

The close relationship of education with people's social world has caused educational research to interact highly with social sciences, including sociology, psychology, and philosophy. Thus, it is observed that educational research covers a broad spectrum in numerous countries. Accordingly, the content, scope, and aim of educational research, in addition to discussions and analyses, are gaining importance to reveal the current state of research in the field and make predictions for the future. Achieving this is possible by investigating the keywords that are frequently used in relevant studies (Pring, 2013). Sports have always been related to education being an indispensable part of it throughout history. Physical education and sports activities are valuable educational tools for developing and maintaining human integrity (Hergüner et al., 2004). Currently, it has been observed that physical education and sports activities that started at an early age are of great importance in positively increasing relations between individuals and societies. In the societies of developed countries, it is accepted as a fact that individuals are trained with respect to their physical, spiritual, and mental aspects within the understanding of education. The most effective way to achieve this is through physical education and sports activities. The field of physical education and sports has developed and will continue to develop largely in parallel with the developments in disciplines such as education, health, psychology, philosophy, and history (Karagözoğlu, 2000; Fişek, 1999; Singer, 1999; Bucher, 1979).

Since educational programs directly channel the education policies of countries and the types of people they will train, they need to be developed and changed under the requirements of the age. The constant change and development of science and technology in our age compel countries to continually renew their education programs to keep up with these changes (Kaptan & Kuşakçı 2002). A curriculum is an experience mechanism that encloses all activities related to the teaching of a course that is planned to be given to individuals within or outside the school (Demirel, 2007).

Research on curriculum development, renovation, and update has been gaining increasingly more emphasis in recent years. The changes and developments that appeared in the 20th century have had their reflections on curricula. The projection of educational targets on the curriculum of physical education and sports courses, just as with other courses, is essential in training individuals who are equipped with the skills and knowledge to adapt to the requirements of the day (Dodge, 1995). Physical education and sports training play a major

role in training individuals who have characteristics such as creativity, critical and versatile thinking, problem-solving, and making healthy decisions (Schwager & Labate, 1993). Curricula are a crucial tool that helps individuals gain these competencies. The contents of curricula are directly related to the quality of education. In this respect, organising the curricula in a planned and systematic manner is highly important (Demirel, 2007). On the other hand, curriculum development studies in physical education and sports play an important role in affecting sports policies and implementations (Doll-Tepper et al., 2016). It can also be said that these studies formed the basis of many sports education reforms in time. With this impact on implementation, it is thought that previous studies will provide the foundations for new research, considering that researchers frequently benefit from previous studies in creating their conceptual and theoretical frameworks.

Bibliometric Analysis

The bibliometric method has become the primary tool for evaluating and analysing scientific research for publications that have increased rapidly in recent years (Salini, 2016). The "Bibliometric Method," analyses the general trends in scientific publications in addition to the relationships between the publications based on the bibliographic data. The method was first utilised by Wyndham Hulme with the title "Statistical Bibliography" (cited by Pritchard, 1969) The concept of bibliometric analysis is also discussed in the form of studying books or other media communication via mathematical and statistical methods (Pritchard, 1969). Studies conducted through bibliometric analysis have become valuable for researchers in listing scientific publications in the growing literature (Andrade et al., 2017). By investigating various aspects of science, bibliometric analysis appears highly functional in making scientific decisions because of the rapid increase in the number of academic publications and the difficulty of their tracking in recent years. It is also increasingly used in the way journals, institutions, and universities are ranked worldwide (Ellegaard & Wallin, 2015).

The use of bibliometric methods is also common in a variety of disciplines to analyse the connection between any study with other studies (Zupic & Cater, 2015) and to outline the general trends toward any subject or field (Hallinger & Suriyankietkaew, 2018; Fahimnia et al., 2015; Bornmann & Mutz, 2015; Liu et al., 2012). Furthermore, the method enables researchers to deeply analyse a large amount of scientific production. Graphic descriptions are also provided about the field of study (Zupic & Cater, 2015; Al & Tonta, 2004). In addition, this method is also used to follow the information flow between countries, disciplines, and groups of people and in evaluating citations, numbers of publications, and other text-based data, which are the indicators of the productivity of institutions (Kurtz & Bollen, 2010). There are different methods to analyse the bibliographic data obtained from databases (Zupic & Cater, 2015; Hudson, 1996; Small, 1973), some of which are "citation analysis," "co-author analysis," "co-citation analysis," and "co-word analysis."

The Aim and Significance of the Study

As is the case in many other fields, systematic compilation studies are increasingly gaining value in physical education and sports. Compared to the traditional literature review, systematic compilation studies are preferred due to their wider scope and being more transparent and less prejudiced (Andrews, 2005; Hong & Pluye 2018). Compilations that include analyses based on the bibliometric method, such as research productivity, citation rankings, and co-occurrences of concepts or citations, have the potential of making significant contributions to the literature. In recent years, the bibliometric method has been frequently used in a variety of disciplines such as education (Ayanoğlu et al., 2021; Begeny et al., 2018;

Gülmez et al., 2020; Gümüş et al., 2020a; Hallinger et al., 2020; Hernández-Torrano & Ibrayeva, 2020) and physical education and sports (Andrade et al., 2013; Müller et al., 2016; Palazón et al., 2015; Kirkendall & Krustrup, 2021). When bibliometric analyses in physical education and sports are considered in the international literature, it is observed that these analyses have been conducted by setting various criteria such as limiting the databases, countries, or the universities where the research is carried out (Belfiore et al., 2019; Gümüş et al., 2020b; Shilbury, 2011; Smolina et al., 2020; Xianliang & Hongying, 2012).

Although the presentation of bibliometric analysis research through visualised maps has been quite widespread in recent years, it is observed that such research is limited to certain areas. In this regard, some bibliometric studies in the field of physical education and sports were detected by scanning the "Web of Science (WoS)" database (Lis & Tomanek; 2021; Contreras-Barraza et al., 2021; Chiu et al., 2021; Iermakov et al., 2021; Baier-Fuentes et al., 2020; Tomanek & Lis, 2020; Jiménez-García et al., 2020; Büyükbaykal & İli, 2020; Gholampour et al., 2019; Huertas González-Serrano et al., 2020; Lis, 2020; Chamberlain, 2019). Even though the visibility of systematic compilation studies has been increasing in the physical education and sports literature in recent years as mentioned above, the number of bibliometric studies seems rather limited. The bibliometric studies available in physical education and sports are particularly limited to a few subjects. For example, the bibliometric study by Lis and Tomanek (2021) aimed to determine and discover the intellectual and conceptual structure of physical education research. The research by Tomanek and Lis (2020) was conducted to evaluate the development of scientific production and to map the thematic scope of physical education research. Büyükbaykal and İli (2020) carried out a study based on bibliometric mapping according to specific criteria to investigate studies in the literature on the concept of e-sports that emerged from the collaboration of entertainment and sports in recent years. Gholampour et al. (2019) investigated the research tendencies between 2011 and 2018 in the journal “Sport Management Review” based on the WoS citation database. Huertas González-Serrano et al. (2020) performed a bibliometric analysis on sports and entrepreneurship on WoS. On the other hand, Lis (2020) made a bibliometric mapping to present the profile of the most efficient and effective titles of sources that published research on sports management.

These studies, which are generally conducted from a descriptive perspective, appear to be limited to overall tendencies in studies and co-author analysis. In addition, they have not included citation, co-citation, and co-word analysis, which are among the most common bibliometric methods. It has also been determined that very few bibliometric studies focusing on educational research in general use up-to-date mapping methods. In this respect, the present study can contribute to the literature by outlining the general status of the physical education and sports-related studies published in the international indexed journals (WoS: SSCI, SCI-Expanded, AHCI, and ESCI) with the help of basic bibliometric analyses and visual maps. In addition, this research can be considered important in supporting bibliometric analyses in the national literature on physical education and sports, revealing current research trends, and providing ideas on the diversity of subject areas to researchers who will engage in research in this field.

Within this scope, this study aims to investigate curriculum research in the field of physical education and sports by employing the bibliometric mapping method. To this end, it is aimed to fill a void in the literature by conducting a general situation analysis about the present status of curriculum studies in physical education and sports based on the publication and citation data obtained from the WoS database. Furthermore, besides the dynamically growing

publication and citation data related to curriculum studies in physical education sports, determining important journals and the most influential studies in this field are also targeted in this research. In addition, the prominent authors, institutions, and countries that contribute to the field of physical education and sports and the scientific cooperation networks among them are also investigated in this study. The present study also focuses on the general themes or the trends of current topics that define the disciplines constituting the basis of curriculum studies in the field of physical education and sports and on the content of the research published in the field. Within the scope of this information, the points that lead the research are determined as follows:

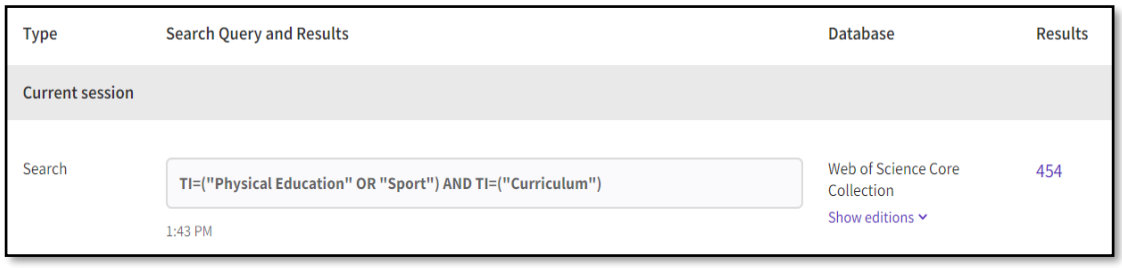
- The distributions of the publications by year and by journals
- The citation ranks of publications, authors, journals, and institutions
- The structures emerged about the co-word network
- The most cited studies and the view of their relationships
- The network maps of the most cited authors and countries shaped
- The most cited authors in co-citation situations

Materials and Methods

In this study, 'Curriculum' studies between the years 1975-2021 in the fields of 'Physical Education' and 'Sports' were investigated using scientific data retrieved from the 'Web of Science Core Collection (WoS).' The analysis of international studies that are indexed in the Social Sciences Citation Index (SSCI), Science Citation Index Expanded (SCI-Expanded), and Arts & Humanities Citation Index (AHCI) was performed utilizing the bibliometric mapping analysis method.

Data Collection for the dataset

The data set, which was carried out in September 2021, covered studies between 1975 and 2021. Accordingly, seven citation indices within WoS were used, which included Conference Proceedings Citation Index-Social Science & Humanities (CPCI-SSH), Conference Proceedings Citation Index-Science (CPCI-S), SSCI, Emerging Sources Citation Index (ESCI), SCI-Expanded, AHCI, Book Citation Index-Social Sciences & Humanities (BKCI-SSH). The WoS was chosen because it is one of the most important databases for scientific citation indices (Wang et al., 2016) while the search query string conducted on WoS was presented in Picture 1.



Picture 1. Search Query String

The search query applied for the keywords 'Physical Education' or 'Sport' and 'Curriculum' on the Web of Science (WoS) screen. For this reason, it can be said that it is the most suitable database for bibliometric research, which was also utilised and reported in the literature (Wang et al., 2016; Zhai et al., 2017). Therefore, the research was carried out by including the

studies in the Web of Science database to ensure that the data is accurate and reliable.

We did not conduct a language restriction on the Web of Science databases during the search for the studies on curricula of physical education or sport for the years in selection. The bibliometric metadata recorded for every document accessed included information about the name of the journal, year of publication, author, institution/affiliation, country, cited references, and the number of citations. Further, the title, the abstract, and the keywords of the documents were also extracted (Nunen et al., 2017). A total of 454 documents were accessed and added to the marked list by typing the keywords (physical education OR sport) AND (curriculum) into the 'title' sections of the query screen on 18 September 2021. As demonstrated in Figure 1, the documents were selected in three phases. During the identification phase, 335 of the documents were removed from the marked list before screening since they received less than five citations, leaving 116 documents to be analysed. In the screening stage, these 119 documents were scanned for relevancy, and five of them were excluded from the research as they belonged to other scientific disciplines. For the last stage of the selection process, 114 studies that met the eligibility criteria were downloaded for the bibliometric analysis in the complete record form, including cited references using tab-delimited Win format. The program 'VOSviewer' (Visualisation of Similarities), a well-known free bibliometric analysis software, was utilised for the analysis and mapping of the relationships among the authors, countries, journals, co-citations, and terms (Van Eck & Waltman, 2010).

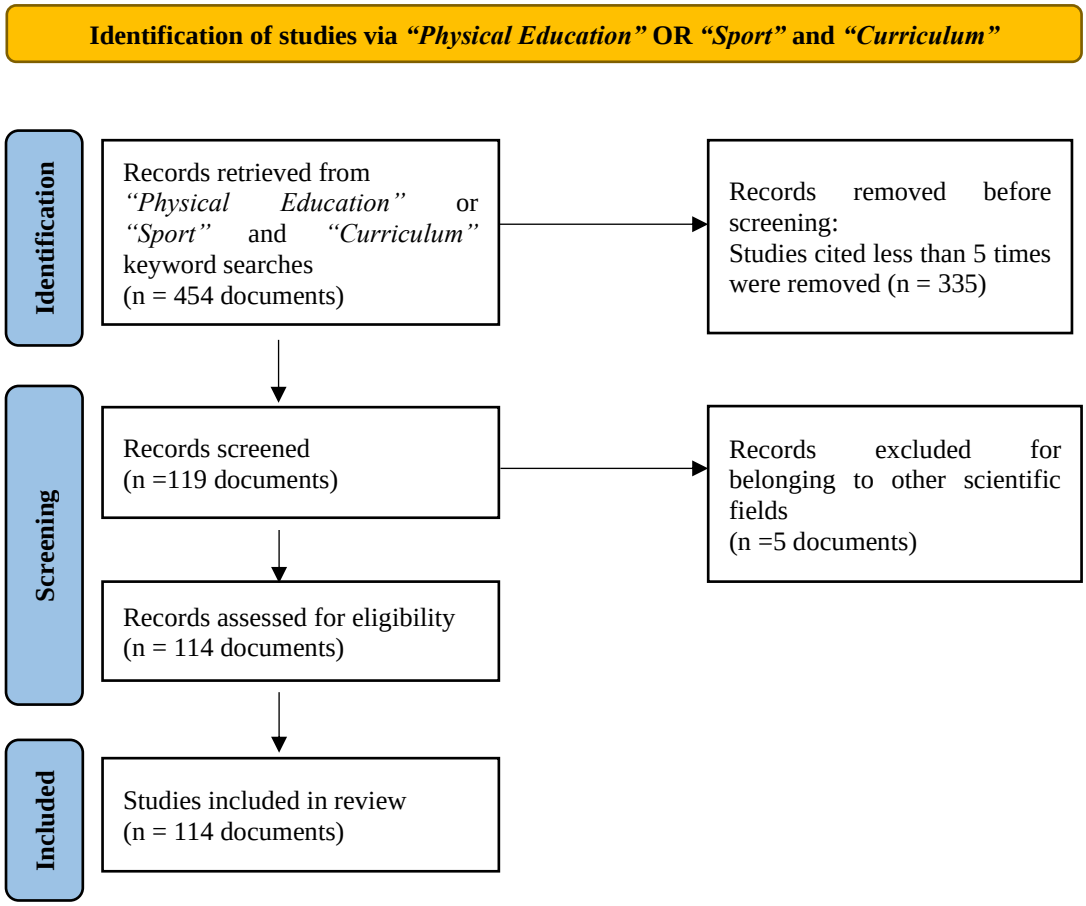


Figure 1. Flowchart of Phases for Identifying and Selecting Documents (PRISMA)

Data Analysis

In the data analysis, the frequencies obtained from the data were used for the statistical analysis of the dynamic trends in publications and citations in the database. The leading authors, institutions, countries, journals, and the most influential publications were ranked through ordinal frequencies among the publication and citation data in curriculum research in physical education and sports. Accordingly, VOSviewer (ver. 1.6.17) was employed to visualise the relationship between authors, institutions, countries, journals, and terms. The software is a tool for creating and visualising bibliometric maps based on network data (Waltman et al., 2010). In VOSviewer, nodes were created representing the objects of interest (items) in the study, i.e., the authors, institutions, countries, journals, and key terms. The links between two nodes (e.g., two researchers who co-authored an article) represent the relationships between these nodes. The strength of each relationship is demonstrated as a numerical value which increases as the link becomes stronger. In a bibliometric map, nodes and links construct networks or clusters. The size of the node signifies the frequency of occurrence of the item in the node (e.g., country, institution), the node colour represents the network, the strength of the relationship between two nodes is displayed with the thickness of the connecting line, and the distance between the nodes is indicative of the relatedness of the items (Hernández-Torrano & Ibrayeva, 2020).

With a distance-based approach, a three-step process (normalisation, mapping, and clustering) is followed in VOSviewer to visualise bibliometric networks (Van Eck & Waltman, 2014). In the first step, the nodes are normalised for differences in the number of links they have to other nodes. The mapping step involves placing the nodes on a two-dimensional field according to the strength of their connection, i.e., the stronger their relationship, the closer their distances. In VOSViewer, the "visualisation of similarities" (VOS) mapping technique is employed with the aim of "minimising a weighted sum of the squared differences between all pairs of items" (Van Eck et al., 2010). In the clustering stage, nodes are designated to a network of nodes that are closely associated. According to the algorithm of VOSViewer, the nodes with the higher number of links are clustered together into groups in terms of the strength of their association (e.g., researchers with increased numbers of co-authored studies) (Waltman et al., 2010).

A citation analysis was conducted to map the network of the most cited publications, authors, and countries. The co-citation analysis examined the areas underlying curriculum research, and the relationships between the most frequently cited authors were determined. Lastly, the co-occurrence of keywords in the publications was investigated to determine the global themes or subjects under focus in curriculum research in the discipline of physical education or sports. The keywords search was conducted in the title, abstract, and keyword list in the publications collected. The frequency of co-existing two keywords in the text was taken as the basis to identify the co-occurrence relationships. As the appearance of the two co-existent keywords in one publication increased, so did their co-occurrence relationship. These keywords that co-occurred frequently were clustered together into networks corresponding to general topics or themes studied in the curriculum research. In the Results and Discussion section, further information is provided to assist the interpretation of bibliographic maps on the citation (documents, authors, countries), co-citation (cited authors), and co-occurrence (authors, keywords) analyses derived from the dataset.

Results

Descriptive Results

A total of 114 documents consisting of articles (N=107), proceedings papers (N=4), review articles (N=2), and book chapters (N=1) published between 1975 and 2021 were examined within the scope of the research. When the distribution of the publications was investigated by year, it was found that the first research in this field was conducted in 1982. During the 1990s, the number of publications appeared to grow, but the highest increase in the volume of publications was observed between the years 2008-2018. On the other hand, in 2019 and 2020, the studies on this subject matter were quite low in quantity. Due to the global pandemic these years, researchers are thought to focus on more up-to-date issues in the sustainability of processes in education. No considerable changes were observed between the years 1975-1992 regarding the variation in the number of citations. As can be seen from the graph, there has been a dramatic increase in the number of citations with an increase in the number of publications in the last ten years. Also, it was detected that there was a rapid increase from 1993 until 2017 in the number of citations, and it was at its peak in 2019. As the number of studies increases, the escalation in the number of citations can be seen as a natural result due to the references between the studies. Since a small number of research studies were conducted in 2019 and 2020, the sharp decrease in citations can be considered evidence for this condition. The number of publications and citations per year are presented in Figure 2.

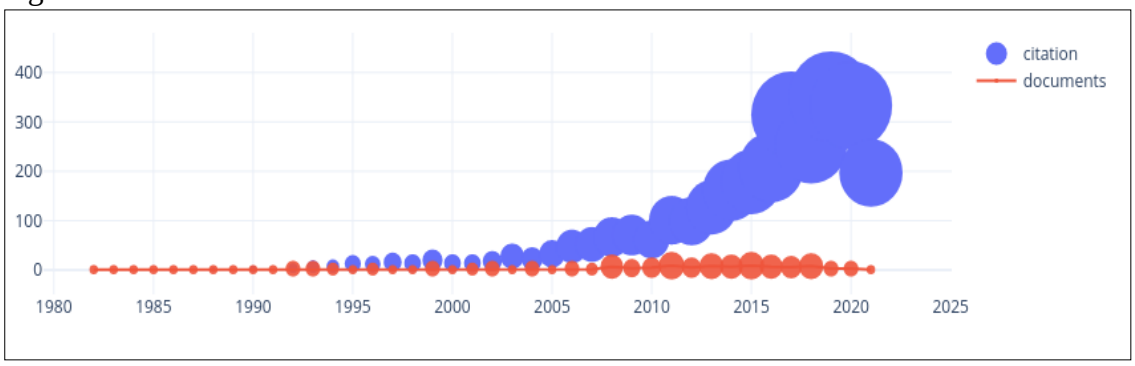


Figure 2. Change of Article Numbers and Citations by Year

Bibliometric Results

In the current study, the number of publications, the number of citations, and the total link strengths, (*TLS: The VOSviewer manual defines each link with a positive numerical value to demonstrate the strength of the link. Accordingly, higher values indicate stronger links. The total link strength feature displays the total strength of the co-authorship links between a certain researcher and others. Within this scope, the authors of the studies included in the research were examined (Table 1)*), of authors who have at least one study and at least five citations in the relevant indexes, the highest-ranking 10 authors based on the maximum number of citations are shown in Table 1. Catherine D. Ennis, Thomas L. McKenzie, James F. Sallis, Dawn Penney, and Bohdan Kolody stand out as authors who study the curriculum in physical education and sports. Furthermore, when the studies conducted by the researchers in Table 1 are examined, it is possible to say that they have made and will make significant contributions to other researchers who will carry out scientific research in this field. In addition, when the TLS of the authors is compared, it is seen that the most prominent author

is Dawn Penney (at the University of Tasmania). This suggests that this author is highly preferred for conducting joint research with authors in different regions.

Table 1. Ranking of the 10 Most Cited Authors

No	Authors	Country	Documents	Citations	TLS*
1	Catherine D. Ennis	USA	6	263	-
2	Thomas L. McKenzie	USA	3	244	28
3	James F. Sallis	Australia	3	244	28
4	Dawn Penney	Australia	4	211	51
5	Bohdan Kolody	USA	2	204	25
6	F. Nell Faucette	USA	2	204	25
7	Mike Jess	Scotland	4	171	47
8	Matthew D. Curtner-Smith	USA	3	153	12
9	Mary O'Sullivan	Ireland	2	139	5
10	Eimear Enright	Ireland	2	120	12

**TLS: Total Link Strength*

The findings regarding the ranks, article numbers, and TLS of the institutions of the most cited authors are presented in Table 2. The University of Alabama is determined as the highest-ranking university in this field. It is seen that the leading authors in terms of their research and number of citations, such as Oleg A. Sinelnikov and Matthew D. Curtner-Smith, work at this university. Second, San Diego State University stands out for the efficiency of their research, and relevantly, Thomas L. McKenzie works at this university. When the TLS is considered, the University of Edinburgh ranks first. It indicates that this university is highly preferred in the context of joint research. In addition, authors such as Mike Jess, Malcolm Thorburn, and Matthew Atencio work at this university.

Table 2. Ranking of the 10 Most Cited Universities

No	Organisation	Country	Documents	Citations	TLS
1.	The University of Alabama	USA	5	252	14
2.	San Diego State University	USA	3	244	14
3.	The University of Edinburgh	Scotland	7	217	38
4.	University of South Florida	USA	2	204	14
5.	University of Limerick	Ireland	4	168	5
6.	The University of Queensland	Australia	5	146	25
7.	The University of Maryland	USA	2	142	1
8.	The University of Tasmania	Australia	2	123	19
9.	The Chinese University of Hong Kong	China	5	105	27
10.	Louisiana State University	USA	1	89	-

The results reveal that the most efficient journal in the field was 'Sports Education and Society' when the studies were analysed based on journals (Table 3). This journal ranks first with 22 articles and 707 citations in this field. The TLS is also higher than the other journals. This journal focuses mainly on pedagogy, the place of physical education and physical activity in society, and social, cultural, and ethical issues related to sports. It can also be said that the journal researched the form and content of physical education and sports in the education system in schools or other educational institutions. The second-ranking journal according to the number of citations is determined as 'European Physical Education Review.' The 15 articles published in this journal received a total of 429 citations, and its TLS is found

as 25. This journal can be said to focus mainly on the development and improvement of physical education curricula applied to children in schools. Another striking data in Table 3 is the Impact Factor values. As demonstrated in the table, the Impact Factor value of the journal, 'Journal of Sport and Health Science', is much higher compared to others. The article from this journal that was investigated in this study was 'Implications of exergaming for the physical education curriculum in the 21st century' (Ennis, 2013). The journal focuses mainly on research on sports, exercise, physical activity, and health sciences. Considering the focus and scope of this journal, it is in last place in the citation ranking due to the limited number of publications related to the curriculum. Therefore, it is an expected result that it ranks last in the citation rankings regarding the subject of our research (Table 3).

Table 3. Ranking of 10 Most Cited Journals

No	Name of the Journal	Documents	Citations	TLS	Impact Factor*
1	Sport Education and Society	22	707	32	4.119
2	European Physical Education Review	15	429	25	3.790
3	Quest	10	369	6	2.910
4	Research Quarterly for Exercise and Sport	7	336	9	2.500
5	Physical Education and Sport Pedagogy	10	202	18	5.830
6	Journal of Teaching in Physical Education	7	175	7	4.155
7	Adapted Physical Activity Quarterly	2	44	2	2.929
8	BMC Public Health	3	44	3	3.295
9	Journal of Human Sport and Exercise	1	34	-	1.064
10	Journal of Sport and Health Science	1	33	1	7.179

**Impact Factor: It represents the values in 2020.*

When the publications were considered from the perspective of countries, the most influential studies were found to be made in the United States of America (Table 4). Five of the most cited 10 universities, as presented in Table 4, are in the United States of America. This ratio suggests that 50% of the most cited universities are in the United States. It can be clearly stated that the ranks of the country according to the number of citations are in line with these results. As presented in Table 4, Australia, the second-highest cited country, ranks in first place in terms of the TLS.

Table 3. Ranking of the 10 Most Cited Countries*

No	Country	Documents	Citations	TLS
1	United States of America	34	1065	25
2	Australia	21	463	37
3	Scotland	10	252	29
4	England	11	200	4
5	China	9	197	17
6	Ireland	4	168	4
7	Canada	6	98	5
8	South Korea	5	63	25
9	Singapore	1	50	4
10	Denmark	1	48	-

** This table is provided to show which countries have done the most effective research.*

Within the scope of the study, the most cited 10 publications are presented in Table 5 with their year of publication, the total number of citations, their average citations by year, and their citations within the past five years. The most cited research is "The More Things

Change, the More They Stay the Same: Factors Influencing Teachers' Interpretations and Delivery of National Curriculum Physical Education" by Curtner-Smith MD conducted in 1999 (Curtner-Smith, 1999). The journal that published this article is "Sports Education and Society," presented in Table 5 as the journal with the highest number of citations. The study, in general, outlines the criteria by which teachers re-created the national physical education curriculum and the psychological factors affecting teachers' decisions. The second most cited article belongs to McKenzie, Sallis, Kolody, and Faucette, entitled "Long-Term Effects of a Physical Education Curriculum and Staff Development Program: SPARK," which was published in 1997 (McKenzie et al., 1997). The most cited article within the last five years is the third-ranking 2010 article by Enright and O'Sullivan, titled "Can I Do It in My Pyjamas? Negotiating A Physical Education Curriculum with Teenage Girls" (Enright & O'Sullivan, 2010). This study describes the solution and transformation of the problems that girls face in physical education courses through participatory action research and the steps to take to overcome the difficulties these students have determined themselves. The focus of the research is the official physical education curriculum of secondary schools.

Table 4. The Citation Numbers of Articles by Year (The Most Cited 10 Articles)

No	Documents	Authors	Publication Year	Total Citation	Average Citation by Years	The number of citations in the last 5 years				
						2017	2018	2019	2020	2021
1	The More Things Change, the More They Stay the Same: Factors Influencing Teachers' Interpretations and Delivery of National Curriculum Physical Education	Curtner-Smith, MD	1999	131	5.7	12	12	10	7	4
2	Long-Term Effects of a Physical Education Curriculum and Staff Development Program: SPARK	McKenzie, TL; Sallis, JF; Kolody, B; Faucette, FN	1997	116	4.64	10	6	2	2	1
3	"Can I Do It in My Pyjamas?" Negotiating a Physical Education Curriculum with Teenage Girls	Enright, Eimear; O'Sullivan, Mary	2010	107	8.92	13	14	23	17	13
4	Creating a Sense of Family in Urban Schools Using the Sport for Peace Curriculum	Ennis, CD; Solmon, MA; Satina, B; Loftus, SJ; Mensch, J; Mccauley, MT	1999	89	3.87	10	2	6	4	4
5	Effects of a Curriculum and Inservice Program on the Quantity and Quality of Elementary Physical-Education Classes	McKenzie, TL; Sallis, JF; Faucette, N; Roby, JJ; Kolody, B.	1993	88	3.03	4	1	0	2	3
6	Sport Education for Teachers: Professional Development When Introducing a Novel Curriculum Model	Sinelnikov, Oleg A.	2009	86	6.62	6	10	8	17	11
7	Curriculum, Pedagogy, and Assessment: Three Message Systems of Schooling and Dimensions of Quality Physical Education	Penney, Dawn; Brooker, Ross; Hay, Peter; Gillespie, Lorna	2009	84	6.46	10	10	10	8	10
8	Physical-Education, Discourse, and Ideology-Bringing the Hidden Curriculum into View	Kirk, D.	1992	81	2.7	5	10	4	4	3
9	Physical Education and Physically Active Lives: A Lifelong Approach to Curriculum Development	Penney, D; Jess, M.	2004	80	4.44	5	4	4	3	3
10	Integrating Sport into the Physical-Education Curriculum in New-Zealand Secondary-Schools	Grant, Bc	1992	66	2.2	4	1	1	3	0

Co-occurrence: Author Keywords

The relational network map created in our research according to the keywords used by the authors is presented in Figure 3. The visual in the figure (co-occurrence: author keywords) was accessed from the keywords tab according to the frequency of at least one-time use. It was observed that a total of 264 keywords were used, but a relational map was created for only 166 of these. In the map generated, 25 clusters emerged. Red, green, purple, blue, yellow, and brown ones stand out among these clusters. The words used in the red cluster (item=8) are more apparent than in other clusters due to their TLS and frequencies of use. Mainly, phrases such as 'physical education,' 'curriculum,' and 'contents' are prevalent. This cluster complies with the theme of our research. In the purple cluster (item=15), the phrases 'curriculum change,' 'complexity thinking,' and 'primary physical education' come to the forefront. The words in this cluster are mostly related to the curricula developed aiming at skills to establish relationships between different dimensions of reality. On the other hand, phrases such as 'pre-service teachers,' 'living the curriculum,' 'body,' and 'health' step forth in the green cluster (item=13). These phrases appear to be linked to teacher training, the relationship of the curriculum with students' thinking styles, and health dimensions. Another salient cluster is the blue cluster (item=11), in which phrases such as 'policy enactment,' 'education policy,' 'policy actors,' and 'higher education' are apparent. It is seen that this cluster is related to education policies. Lastly, phrases such as 'complex movement,' 'curriculum transformation,' 'critical pedagogy,' 'knowledge,' and 'discourse analysis' are noticeable in the yellow cluster (item=9). It is seen that the words in this cluster are mostly related to the transformation of teaching programs according to the cognitive, sensory, and psychomotor levels of the students.

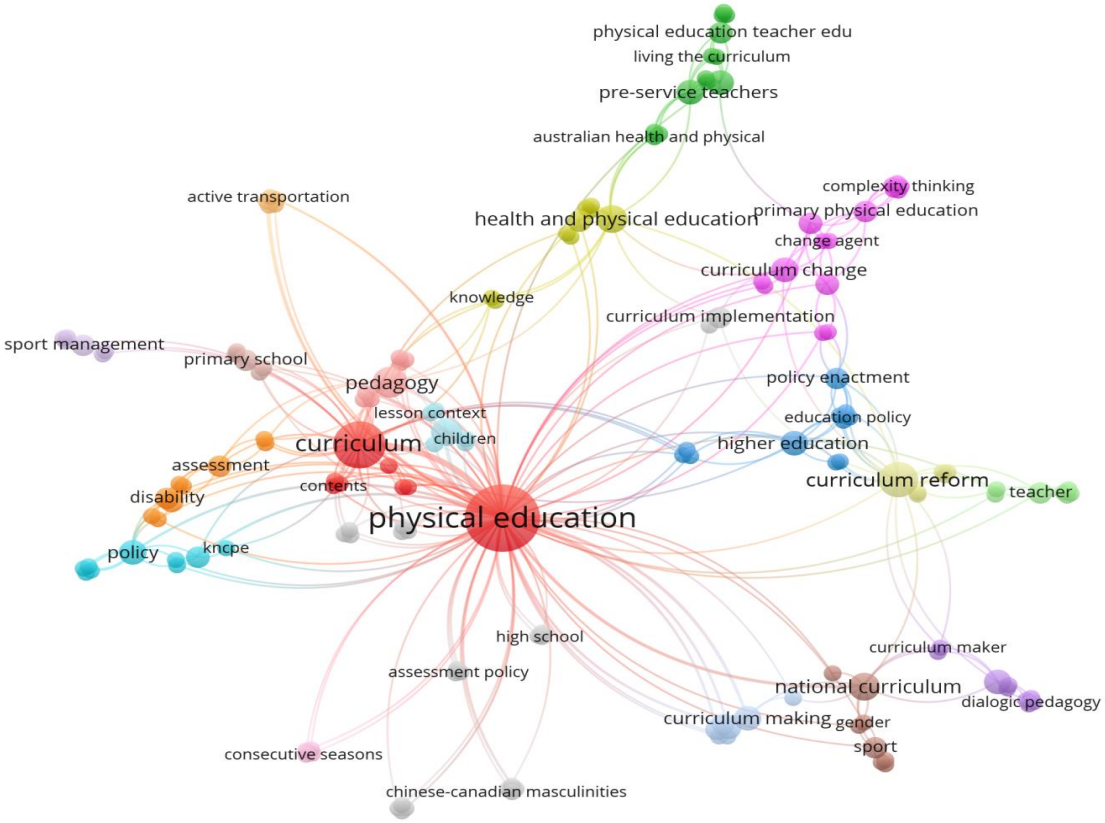


Figure 3. The Network Map of the Most Frequently Used Keywords

Citation: Documents

The most cited studies and their map of item density visualisation are presented in Figure 4. At first, articles with a minimum of five citations were included in the research. The phrase "minimum number of citations of a document=0" was entered in the next step. In this way, the data of a total of 112 articles were obtained. However, only 48 studies have produced a relational network map from this data. In the visual created, nine clusters emerged. The colours that symbolise the research in the visual vary from blue to red according to the number of citations. The author of the most cited study is identified as Curtner-Smith (N=131). In this study, the subject was the restructuring of the curricula according to teachers' views and decisions in general. In addition, the psychological factors that affected teachers during the decision-making process were also outlined (Curtner-Smith, 1999). The other researchers that were cited most in the same cluster were McKenzie, Sallis, Kolody, and Faucette (1997) (N=116) and McKenzie, Sallis, Faucette, Roby, and Kolody (1993) (N=88) (McKenzie et al., 1993; McKenzie et al., 1997). In their 1997 study, McKenzie et al. investigated the effects of a health-related physical education program on the quality of lessons in an experimental 4-year study with physical education teachers, classroom teachers, and a control group (McKenzie et al., 1997). Another highly cited article was by Enright and O'Sullivan, published in 2010 (N=107). In this study, research has been carried out on the transformation of an official secondary school curriculum to solve the problems that girls have in physical education classes (Enright & O'Sullivan, 2010). A study that also attracts attention in this cluster is entitled "Physical-Education, Discourse, and Ideology - Bringing the Hidden Curriculum into View" by Kirk (N=81). This study outlines the physical education curriculum from a philosophical perspective. The curriculum and the hidden curriculum are reviewed in terms of concepts that are discussed comparatively with each other. It stated that content that is intentionally or unintentionally excluded from application teaches a different behaviour with implicit permanent traces instead of the behaviour that is fundamentally intended to be learned (Kirk, 1992). With this aim, it is emphasised that hidden curricula are not unimportant in the success of students and teachers. This study can be said to be a publication that makes in-depth analyses on hidden curricula, which especially guides the researchers interested in curriculum development. A prominent study in the other most cited cluster was by Penney and Jess entitled "Physical Education and Physically Active Lives: A Lifelong Approach to Curriculum Development" (N=80). This study is related to the involvement of the concepts of lifelong learning and lifelong physical activity in the physical education curriculum (Penney & Jess, 2004). It is discussed that there is a need to expand skills, knowledge, and understanding in the curriculum and to accept a lifelong curriculum as the common responsibility of organisations and individuals within and beyond the existing formal educational structures. In another cluster, the study by Penney, Brooker, Hay, and Gillespie with the title "Curriculum, Pedagogy, and Assessment: Three Message Systems of Schooling and Dimensions of Quality Physical Education" was the most cited research (N=84). This study states that quality physical education is certainly related to the three dimensions of curriculum, pedagogy, and assessment (Penney et al., 2009). The authors of the other study that stands out are MacLean, Mulholland, Gray, and Horrell (N=26). In this article entitled "Enabling Curriculum Change in Physical Education: The Interplay between Policy Constructors and Practitioners," a mixed method was employed. In the quantitative part of the research, the perceptions of physical education teachers about the change of curriculum were assessed, and in the qualitative section, their thoughts after a meeting with the politicians involved changing the curriculum were gathered (MacLean et al., 2015). The most important conclusion from this research is that there is a discrepancy between the perceptions of actively working physical education teachers and politicians about the change of curriculum.

In conclusion, it was observed that there were no strong connections between authors who studied this field. The TLS remained limited with clusters created among some authors. Especially the author Catherine D. Ennis (N=263), who made a substantial contribution to the field, is not seen in the relational network map. In this respect, it can be said that common links between the studies carried out will contribute to this field more by increasing the quality of the research.

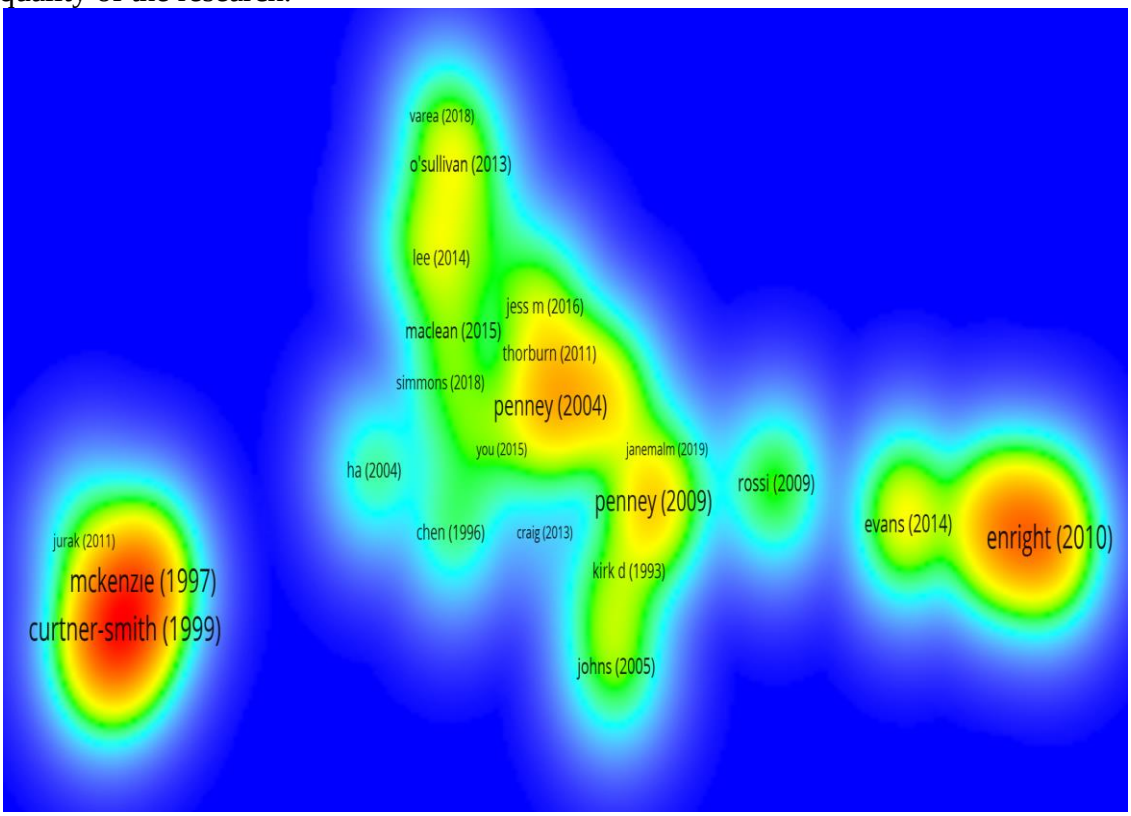


Figure 4. Density Visualisation of the Most Cited Studies

Citation: Authors

The most cited authors and the relational network map they generated are presented in Figure 5. Studies with 25 authors and above were not included in the map. In this way, data were obtained for a total of 230 authors. However, a relational network map was retrieved only among 84 authors in this data. In the visual representation, seven clusters were formed. The size of the circles representing the authors indicates the amplitude of the citation frequencies. Of these clusters, yellow, green, turquoise, red, purple, and orange ones are more clearly visible. When the authors are ranked by their citations in the yellow cluster, which is the most distinctive cluster (Item=11), Thomas L. McKenzie (N=244), James F. Sallis (N=244), Bohdan Kolody (N=204), and F. Nell Faucette (N=204) attract attention. The author who ranked first place in terms of citations in Table 1, Catherine D. Ennis (N=263), is not represented in the visual due to not having any associations with other authors (TLS=0). In the green cluster (item=17), authors such as Dawn Penney (N=211) and Jess Mike (N=171) are prominent. Further, the TLS of the authors in this cluster is considerably higher compared to authors in other clusters. Therefore, it can be concluded that their connections with other authors are strong and notably dense on the relational network map. In the turquoise cluster (item=6), Matthew D. Curtner-Smith (N=153) and Mary O'Sullivan (N=139) step forward. On the other hand, many authors clustered in the red cluster (item=22). Eimear Enright

(N=120), David Kirk (N=110), Lorna Gillespie (N=84), and Ross Brooker (N=84) are the authors who stand out according to the citations they received. This cluster also has a strong network in the sense of link strength, as in the green cluster. The orange cluster (item=5) is situated in a terminal point since the studies here were conducted in connection with some of the authors in the yellow cluster only. Similarly, as the purple cluster (item=8) has carried out studies associated with some authors only in the green cluster, it is situated in an endpoint.

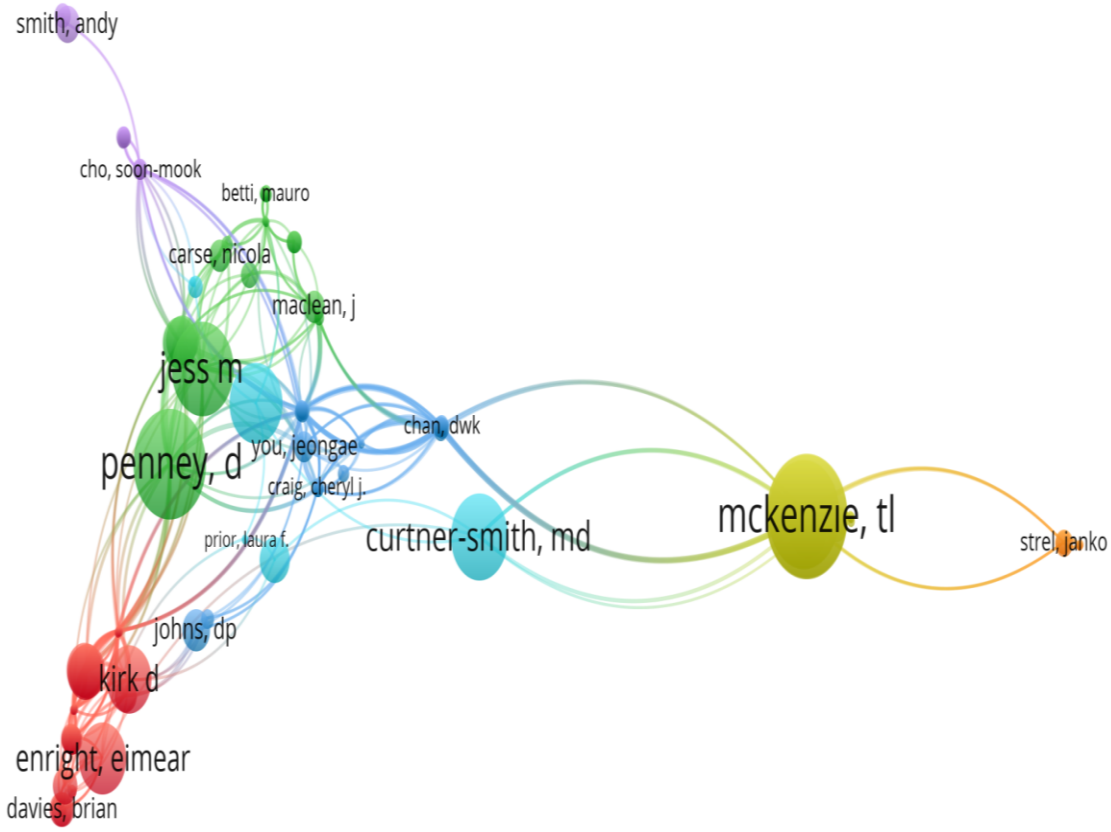


Figure 5. The Network Map of the Most Cited Authors

Citation: Countries

The relational network of the most cited countries in our study is demonstrated in Figure 6. Publications with 25 authors and above were excluded from the analysis, while countries with at least one article were included. With this procedure, data were obtained for a total of 22 countries. However, it was found that a relational map was formed only among 15 of them. In the visual map that emerged, five clusters were formed. The size of the circles in the visual is indicative of their number of citations. Of these clusters, the red, yellow, green, and blue ones look distinctive. In the red cluster (item=3), the countries the USA (N=1065), England (N=200), and Slovenia (N=34) formed a network. It is seen that England had associations mostly with the USA and Australia, whereas Slovenia was in connection only with the USA in this cluster. Australia (N=463), Scotland (N=252), and Singapore (N=50) were situated in the yellow cluster (item=5). In the green cluster (item=3), China (N=197), Canada (N=98), and South Korea (N=63) were emergent. The striking finding in this cluster is that South Korea had connections with all clusters. Lastly, the countries Ireland (N=168), Brazil (N=26), and Romania (N=17) were grouped in the blue cluster (item=3). In this group, Brazil is found to have connections only with Romania. Likewise, Wales had an association only with Australia.

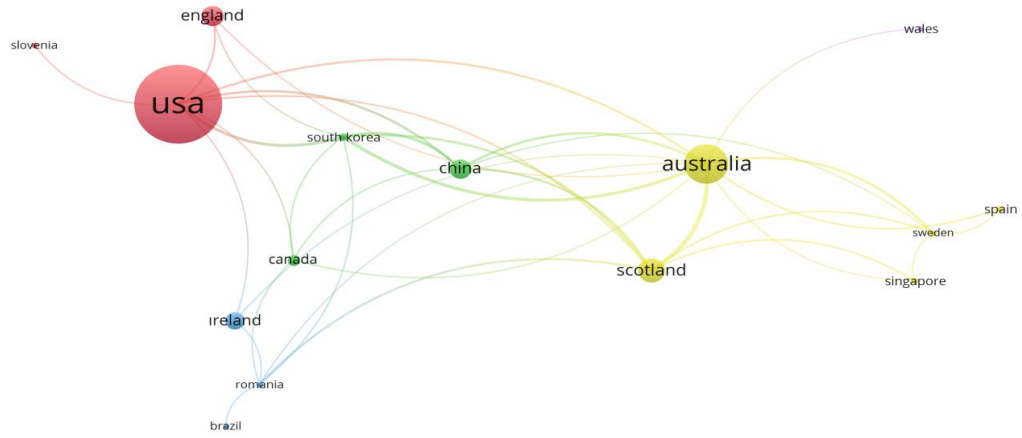


Figure 6. The relational network map of the most cited countries

Co-citation: Cited Authors

The relational network map of the most co-cited authors is presented in Figure 7. The parameter "minimum number of citations of an author: 5" was used in the analysis. In this manner, data for a total of 130 authors were obtained. However, a relational network map emerged for 129 of them. A total of eight clusters emerged in the visual. The dimensions of the circles representing the authors are proportional to their TLS. The green, red, yellow, purple, blue, turquoise, and brown clusters are evident among others. While evaluating the authors, greater 'TLS' values indicate the co-citation frequency of the author by other authors. In this respect, the author David Kirk (TLS=2250) is the most co-cited author with the highest TLS in the green cluster (item=25). The studies by this researcher appear to have noticeably contributed to other researchers in the field of physical education or sports curricula. In the yellow cluster, which is also salient (item=21), Dawn Penney attracts attention as the most co-cited author with the highest TLS (TLS=1880). In the red cluster (item=32), Catherine D. Ennis (TLS=451) and Daryl Siedentop (TLS=469) are visible as the most co-cited authors. A striking point in this cluster is that Daryl Siedentop was among the most co-cited authors although his publications were not in our dataset. It can be concluded that Daryl Siedentop has made important contributions as he is frequently co-cited by authors who have studied this field. Especially, one of his books, "Sports Education: Quality PE Through Positive Sport Experiences", which was published in 1994, is a milestone in the field of sports education. According to Siedentop (1994), sports education aims to help students become competent, literate, and enthusiastic athletes. The use of the word 'literate' signifies how important curriculum research studies are. In the purple cluster (item=11), the most notable author is Craig, Cheryl J. (TLS=658). Another author who stands out in the same cluster is John Dewey. Even though he is not among the researchers examined within the scope of our research, Dewey is one of the authors co-cited in the studies investigated in our study. Especially, the theories he developed in the 1900s about the education system still make substantial contributions to curriculum development. Dewey particularly emphasises the need for the students to be at the centre of the curriculum. Viewed from this perspective, the findings obtained in our study are coherent.

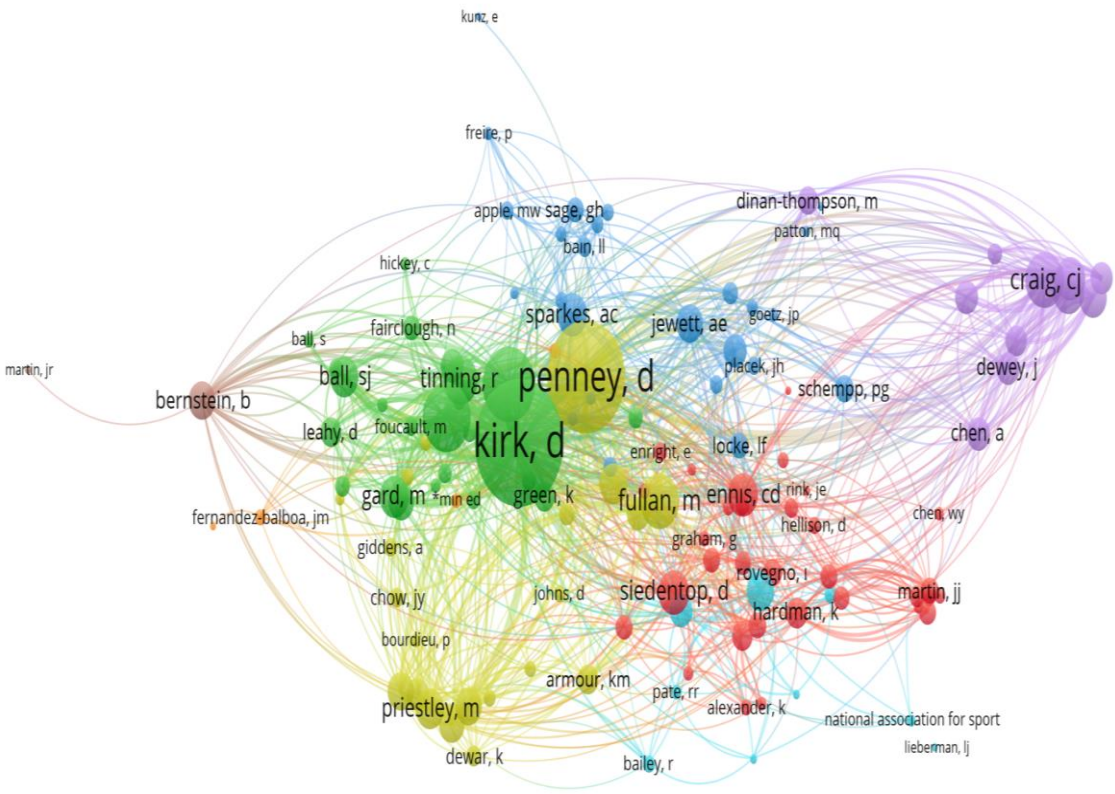


Figure 7. The Network Map of the Most Co-Cited Author

Conclusion

This study provides a global perspective on the evolution and the current status of the curriculum research studies in physical education and sports within the past 46 years by drawing upon the data available in the WoS database. The results suggest that there is a field of research in physical education and sports that has increased exponentially in the last two decades. Particularly, scientists from the United States of America are at the core of the studies, and research on the curriculum in physical education and sports is intensively carried out at universities in the United States. However, a small group of scientists from European and Asian countries have also a limited number of studies in this field. Studies on physical education and sports curricula are predominantly published in journals specialising in the field of sports. Nevertheless, a remarkable finding is that the journals specialising in the scope of sports and education were considerably limited in number. Lastly, the results indicate that researchers in this field investigated a variety of subjects that can be grouped into four main groups: 'health and physical education,' 'curriculum reform,' 'contents,' and 'pre-service teachers.' The findings also point out that the studies in physical education and sports curriculum are performed with a focus on current developments. On the other hand, the interdisciplinary nature of the research in the field reflects the progress made by academics from different disciplines and perspectives. In addition, the studies of the academics in this field can be said to deal with physical education and sports curriculum from the perspectives of various education levels and a variety of subjects (e.g., disability, policy, complexity thinking). Nonetheless, the results reveal that research for understanding the structure of physical education and sports curriculum to date is limited by the information produced by a small group of authors, institutions, and countries who share similar theoretical and conceptual approaches. More theoretical and empirical research from other countries is

needed to obtain comprehensive views on the development of physical education and sports curricula. The prominent researchers in the field may conduct international comparative studies with academics from countries that are not represented in this current study. However, when the relational network map between the authors is examined, it is seen that collaborative studies are limited. Finally, a co-occurrence analysis of the keywords of the publications in the dataset was conducted to reveal general themes or current focuses on curriculum research in physical education and sports. In this analysis, the items of interest are the keywords extracted from the keyword list from the title, abstract, and whole documents that were retrieved. The results show that the most frequently used keywords are "physical education", "curriculum" and "contents". In this context, it can be said that the most frequently used keywords in research are shaped in accordance with the theme of the current study.

Limitations and Future Research

Bibliometric analyses constitute a significant method to map the state of the art in a specific area of scientific knowledge. By conducting bibliometric analyses, essential information can be identified for various aims, such as creating research opportunities and supporting scientific studies. Therefore, bibliometric mapping is a current technique that is most frequently used in recent years to identify gaps and trends in research in the literature. The current research was conducted to determine the current status and trends of curriculum studies in the field of physical education and sports. However, there are some limitations in the research. The first of these is that bibliometric examinations may not provide an excellent picture of the developments and current state of the discipline. Additionally, the findings of this study are limited in scope since a specific database is used. Further studies may consider expanding the findings of the present study by exploring alternative databases (e.g., Scopus, ERIC, PsycINFO, PubMed). Despite these limitations, it is thought that this study will contribute to the discipline and researchers by outlining the current state and development of research on physical education and sports curriculum. In addition, the mappings in further studies can examine the structure of curriculum research for physical education and sports by considering categories other than those investigated in this research. Contrary to these limitations, it is believed that this study provides a comprehensive investigation in bringing the developments and current status of the physical education and sports curricula research into the light. Additionally, the WOS database provides the opportunity to search for studies published since 1975. Therefore, studies conducted before 1975 were not included in the present study. Since the software used for bibliometric mapping works on files downloaded from databases, future researchers can help identify early studies in the field by systematically reviewing studies before 1975.

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Conflicts of Interest

We wish to confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome.

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