

Emerging trends in physical education and inclusive education: A scientometric analysis

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ABSTRACT

Background Problems: In recent years, there has been a growing recognition of the importance of inclusive education and physical education in promoting equality, diversity, and overall well-being among students. However, there is a need for a comprehensive understanding of the scholarly landscape and emerging trends in this field.

Research Objectives: The aim of this study is to develop a scientometric analysis of scientific production on inclusive education and physical education. **Methods:** The databases used in this study were acquired from the Web of Science (WoS) and SCOPUS, with the most recent update occurring in 2021. The bibliographic datasets were pre-processed using ScientoPy and VOSviewer. **Findings/Results:** The results showed that: (i) The trend of publications related to inclusive and physical education has reached 438 papers since its first publication in 1968. Additionally, it is demonstrated that the distribution of papers increases progressively over time. (ii) Justin A. Haegele of Old Dominion University, Norfolk, United States, has become the most contributing and influential writer in the field of inclusive education and physical education, with 11 papers and 192 citations; Of the 10 journals identified, Physical Education and Sport Pedagogy was the journal that contributed the most with 33 papers; the most influential top paper with 172 citations was entitled "Inclusive physical education from the perspective of students with physical disabilities." The most frequently used keywords were "physical education," "inclusion," and "inclusive education." **Conclusion:** The scientometric analysis revealed a wealth of research on inclusive and physical education for students with disabilities, thereby broadening the scope of adaptive physical education. By emphasising the role of inclusive education in promoting equality, diversity, and overall well-being among students, this research contributes to the ongoing discourse on the establishment of inclusive environments in educational settings.

Keywords: Inclusive education; physical education; scientometric

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INTRODUCTION

Inclusive education refers to the education of all children (UNESCO, 2017). Inclusive education is recognised as a human right and the basis for a just and equitable society (European Agency for Development in Special Needs Education, 2012; Forlin, 2013).

Inclusive education can be defined as an educational approach that proposes a school in which all students can participate and are treated like valued members of the school (Moriña, 2017). Overall, inclusive education is a matter of adopting a socio-ecological approach regarding the interaction between student abilities and environmental demands, emphasising that education systems must adapt and reach all students, not the other way around (Nilholm & Göransson, 2017; Walker et al., 2014). Inclusive education focuses on the need to provide a high-quality educational response for all students, enhancing practices that lead to full participation (Messiou et al., 2016).

Besides being an ongoing process guided by equality, inclusive education must also be configured as an outcome (UNESCO, 2020). In particular, inclusive education is firmly committed to equal outcomes for all learners (Flecha, 2015). This spectrum of ways of thinking about inclusive education results in a lack of theoretical determination of its boundaries and disagreements in the same perspective, which hinder his understanding (Hansen, 2012). These differences reflect little agreement on what inclusive education means (Warnock & Norwich, 2010); the latter may become keywords and slogans for mission statements and political speeches (Portelli & Koneeny, 2018). However, it cannot be denied that inclusive education has been defined as a current that influences educational and social contexts and, as a result, has sparked research from several approaches to understand it.

The subject of physical education, in its intention to ensure inclusive education, should be developed with particular attention to some of the conditioning factors that can result in situations of exclusion and failure: disability (Healy, 2014), low level of motor competence (Bejerot & Humble, 2007), physical appearance (Li et al., 2017), sexual orientation (Gill et al., 2010), social insecurity (Fuller et al., 2013), team/group selection (Grimminger, 2014), and gender (Valley & Graber, 2017). Recognising this and many other aspects forces us to tackle inclusive physical education from a critical approach (Fitzpatrick, 2013) to announce, report on, and change the barriers and limitations that hinder quality learning. We agree with UNESCO (2015) that inclusion and quality in education are reciprocal and mutually reinforcing. Besides guaranteeing understanding and meeting the indicators set by different institutions (McLennan, 2018), quality physical education is associated with physical education, where teachers have a rigorous knowledge of these subjects by utilising evidence-based teaching strategies. Thus, physical education teachers must be immersed in lifelong learning, demonstrate pedagogical competence to provide effective educational responses, and ensure all learners' presence, participation, recognition, acceptance, learning and performance in a safe and free environment of violent practices. Inclusive physical education is also concerned with providing effective and positive learning opportunities that reflect different levels of support (Griggs & Medcalf, 2015).

The concern for understanding inclusive education and responding to class diversity is reflected in the growing production on this topic, and physical education is no exception. Researchers have been encouraged to conduct in-depth studies on inclusive and physical education. These studies can be in the form of empirical methods (Braksiek, 2022; Mangope et al., 2013; Penney et al., 2018; Rojo-Ramos et al., 2022), literature reviews (Hutzler et al., 2019; Pocock & Miyahara, 2018; Rekaa et al., 2019; Ruscitti et al., 2017; Tant & Watelain, 2016; Wilhelmsen et al., 2019), and mapping using bibliometric studies (Pérez-Gutiérrez et al., 2021). Although Pérez-Gutiérrez et al. (2021) previously discussed this bibliometric study from 1969 to 2018, no one continued this mapping using the scientometric method until 2022 and analysed using ScientoPy or VOSviewer, so this is one of the gaps that can be developed as well as the reason why this study is essential.

The purpose of this mapping is to carry out a scientometric analysis of scientific production in inclusive and physical education, focusing on productivity, topics, and collaboration patterns. It provides a comprehensive perspective on the theme, detecting promising or undermining areas and determining collaboration patterns. Thus, administrators and policymakers can evaluate research performance on inclusive education and physical education to make evidence-based decisions. In contrast, scholars and education professionals can assess their research areas and direct their future work.

Scientometrics is the science of science with a different identity and methodology (Garfield, 2009). The term has grown in popularity and recognition in recent decades and is used to describe the study of science, including the growth, structure, interrelationships, and productivity of specific research (Ramy et al., 2018). Mingers and Leydesdorff (2015) found that the main themes of scientometric research include how to measure the quality and impact of research. Scientometrics deals with the effects of some things (research), but not what (Abramo, 2018).

Scientometrics describes a comprehensive picture of research activities in the field and can present existing trends supported by quantitative data. In this study, a scientometric approach was adopted to investigate inclusive education and physical education. Thus, increasing output on inclusive education and physical education makes scientometrics a valuable tool for determining publishing trends, topics represented, collaboration patterns, or the most essential authors or institutions.

METHOD

The Scopus database and Web of Science (WoS) were used to collect and analyse data for this study. This bibliographic database contains information on high-quality multidisciplinary research published in scientific journals with significant global impact. It allows the consolidation of data sets to contribute to this research (Santamaria-Granados et al., 2021), and the most frequently visited databases by previous researchers worldwide (Sweileh, 2020; Yang et al., 2021). This section describes the collection of bibliographic datasets and their pre-processing.

Dataset Collection

Initially, a special paper search from the Web of Science (WoS) and Scopus databases was conducted. The search keywords were “inclusive” OR “inclusion” AND “physical education.” Document searches focus on inclusion, sport, and physical or recreational activity in an educational context. For information retrieved from the bibliographic platform on January 2, 2022, filters were applied to searches by years 1962–2021 (Scopus) and 1996–2021 (WoS). The search is also limited to papers using English, and the types of documents entered only consist of articles and article reviews. The number of papers obtained was 670, consisting of 367 Scopus databases and 321 WoS databases.

Table 1. Filters are Applied to the Search String. The Documents Correspond to the WoS and Scopus Datasets

Filter	Scopus	Papers	WoS	Papers
By years: Limit-to	1962 to 2021	541	1996 to 2021	549
By document type: Include	Article & Review	470	Articles & Review Articles	430
By language: Limit-to	English	369	English	321
By source type: Exclude	Book Series	367	-	-

Pre-processing Data

Pre-process bibliographic datasets generated with the ScientoPy tools (Ruiz-Rosero et al., 2019a) and VOSviewer (Van Eck & Waltman, 2019) to produce co-occurrence maps of keywords related to inclusive education and physical education. Table 2 shows a pre-

processing summary of duplicate documents that were removed from the combined Scopus and WoS data sets. In addition, it presents statistical information on bibliographic datasets filtered by document type (articles and review articles). Specifically, the first information column describes the input data set. The second column determines the number of documents issued and the number of papers generated from the duplicate filter. Finally, the third column shows the relative percentage before and after the filter.

Table 2. Pre-process Brief with ScientoPy for the Dataset Obtained from WoS and Scopus

Information	Number	Percentage
Total Loaded papers	670	
Omitted papers by document type	0	0
Total papers after omitted papers removed	670	
Loaded papers from WoS	303	4.52%
Loaded papers from Scopus	367	5.48%
Duplicated removal results:		
Duplicated papers found	232	3.46%
Removed duplicated papers from WoS	0	0
Removed duplicated papers from Scopus	232	6.34%
Duplicated documents with different cited by	164	7.07%
Total papers after removed duplicated	438	
Papers from WoS	303	6.92%
Papers from Scopus	135	3.08%

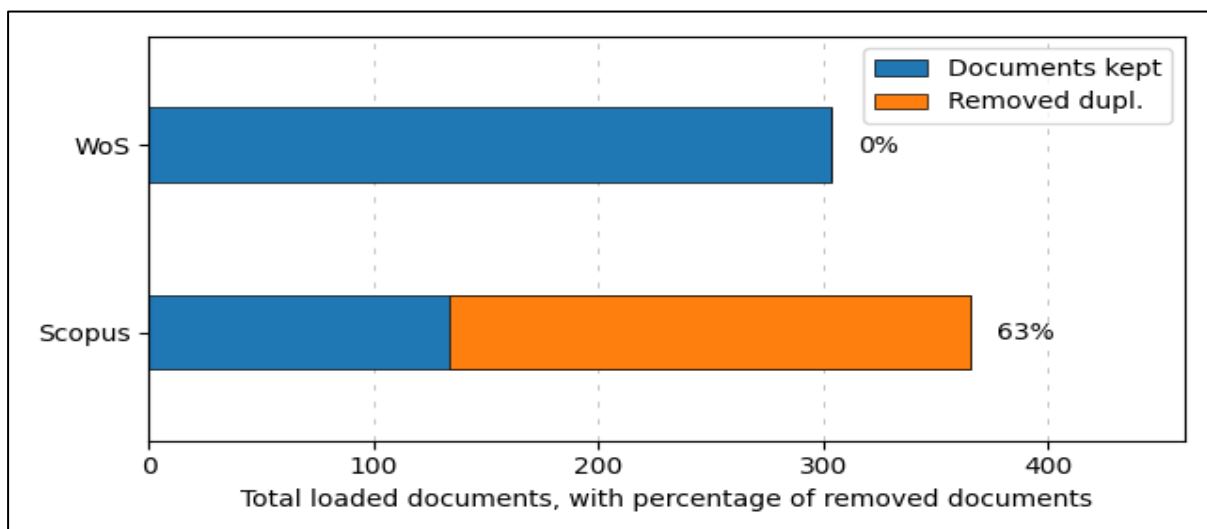


Figure 1. Data Pre-Processing from WoS and Scopus Databases

The pre-processing graph in Figure 1 shows the entire document loaded for each database and the duplicate records removed. Based on Figure 1, the ScientoPy pre-processing script places the WoS document on top of the Scopus document; there are more documents from the WoS database than Scopus after removing duplication. The raw source dataset used in this study includes 670 articles and entries added from the WoS and Scopus databases. This study has eliminated 232 articles from automatically classifying ScientoPy publications as articles and review articles. After data reconciliation, the study worked with 438 individual entries from both databases, containing 304 articles from WoS and 134 articles from Scopus. Duplicate articles from WOS were not found, while 232 similar articles were removed from the Scopus database.

RESULT AND DISCUSSION

1. Trends of Publications

A total of 438 papers related to inclusive education and physical education were collected from the late 1960s onward. The distribution of papers shows a progressive increase over time. The continuously high numbers show that inclusive education and physical education have always been essential research areas in related disciplines. There was a significant increase in the paper starting in 2017–2021. Based on Figure 2, it can be seen that WOS contributed quite a lot to Scopus. Of the two databases used (WOS and Scopus), 304 papers were contributed by WoS and 134 papers by Scopus.

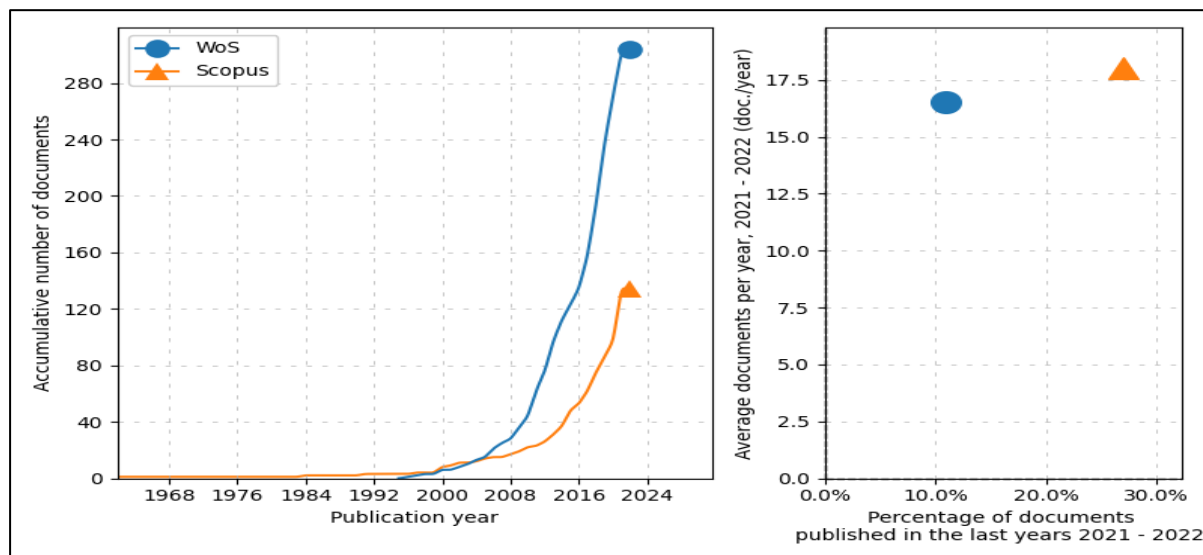


Figure. 2 The Growth of Publications on Inclusive Education Research and Physical Education in the WoS and Scopus Databases

2. The Most Influential Authors, Journal and Papers in the Field of Inclusive Education and Physical Education

Author

Researchers use the number of publications and the number of article citations as a way to identify the most active and influential researchers in the fields of inclusive education and physical education. Quotations are used as a measure of influence (Zupic & Cater, 2015). Table 3 and Figure 3 list the top ten authors contributing significantly to inclusive and physical education research. The table includes total publications, average growth rate (AGR), average documents per year (ADY), percentage of documents in recent years (PDLY), and the h-index of authors. Meanwhile, Table 4 lists the top ten authors who have had an impact based on the number of citations. The fact that indispensable authors are cited in research helps in their dissemination and scientific recognition. Tables 3 and 4 are presented so that future readers and researchers identify the names of well-known authors in the fields of inclusive education and physical education with whom they are likely to collaborate in the future.

Justin A. Haegle of Old Dominion University, Norfolk, United States, is the most contributing and influential author in the field of inclusive education and physical education, with 11 papers and 192 citations. Meanwhile, if we look at the last two years (2020–2021), Anthony John Maher from Leeds Beckett University, Leeds, United Kingdom, is the author who has contributed the most to publishing three papers (50%).

Table 3. The Top Ten Proactive Authors on Inclusive Education Research and Physical Education

Rank	Author	Total	AGR	ADY	PDLY	h-index
1	Haegele, J.A.	11	1.0	2.0	36.4	6
2	Hutzler, Y.	6	-1.0	0.0	0.0	4
3	Maher, A.J.	6	-0.5	1.5	50.0	5
4	Wang, L.J.	6	-0.5	0.5	16.7	4
5	Block, M.E.	5	-0.5	0.0	0.0	4
6	Garrett, R.	5	0.0	0.0	0.0	4
7	Hodge, S.R.	5	0.0	0.0	0.0	4
8	Lieberman, L.J.	5	0.0	1.0	40.0	3
9	Reina, R.	5	-1.0	0.5	20.0	4
10	Wrench, A.	5	-0.5	0.0	0.0	4

AGR, Average Growth Rate; ADY, Average Documents Per Year, PDLY, Percentage of Documents in Last Years.

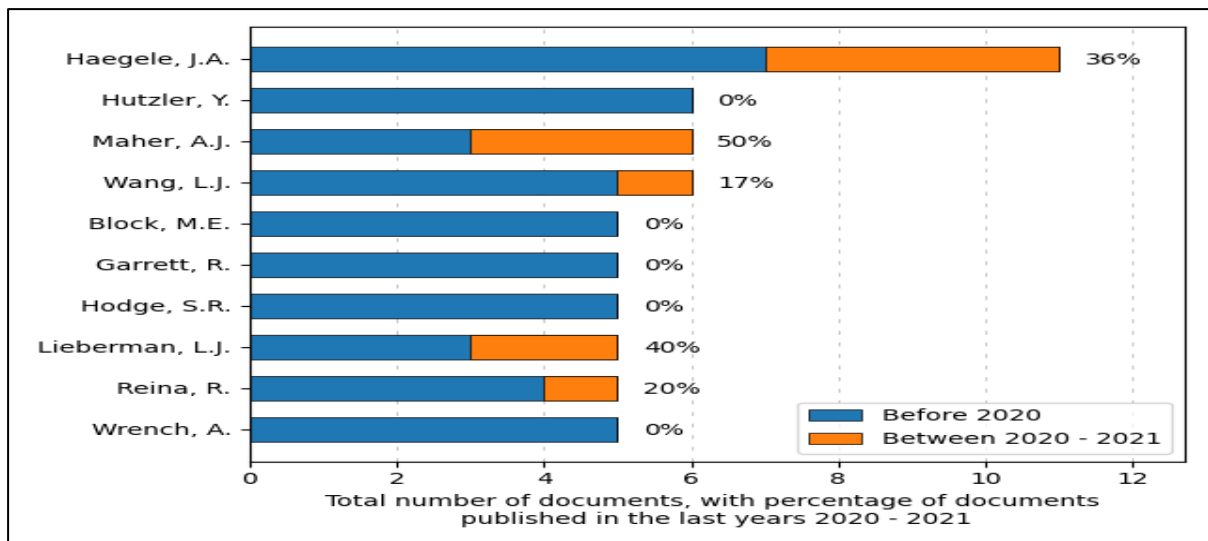


Figure 3. Percentage of Documents Published in the Last Years 2020-2021

Table 4. Author of Most Cited Articles in the field of inclusive education and physical education

Rank	Authors	Country	Citations
1	Haegele, J.A.	United States	192
2	Hodge, S.R.	United States	146
3	Hutzler, Y.	Israel	134
4	Qi, J.	China	120
5	Block, M.E.	United States	117
6	Gonzalez-Villora, S.	Spain	113
7	Lieberman, L.J.	United States	90
8	Klavina, A.	United States	83
9	Garrett, R.	Australia	77
10	Maher, A.J.	United Kingdom	72

Journal

Researchers used the number and citation of papers published in journals to identify the most active and influential journals in the fields of inclusive education and physical education. Table 4 presents 10 journals in terms of the number of papers published in the inclusive and physical education fields. Of the 10 identified, Physical Education and Sport Pedagogy was the journal that contributed the most, with 33 papers. Meanwhile, Table 5 presents the 10 leading journals in terms of the number of journals cited in the fields of inclusive education and physical education. Of the 10 identified, Adapted Physical Activity Quarterly is the most influential journal, with 996 citations.

Table 5. 10 Journals Published in the Field of Inclusive Education and Physical Education

Rank	Journals	Total	AGR	ADY	PDLY	hIndex
1	Physical Education and Sport Pedagogy	33	2.0	3.5	21.2	15
2	European Physical Education Review	32	2.5	5.5	34.4	12
3	Sport Education and Society	28	-0.5	2.5	17.9	15
4	Adapted Physical Activity Quarterly	23	-1.5	0.0	0.0	18
5	International Journal of Inclusive Education	16	1.5	4.0	50.0	7
6	Quest	12	-0.5	0.5	8.3	7
7	Palaestra	11	0.0	1.0	18.2	4
8	Sport, Education and Society	11	4.5	5.0	90.9	2
9	Research Quarterly for Exercise and Sport	9	0.5	1.0	22.2	7
10	European Journal of Special Needs Education	8	0.5	1.0	25.0	6

Table 6. 10 Journals Cited in the Field of Inclusive Education and Physical Education

Rank	Journals	Citations
1	Adapted Physical Activity Quarterly	996
2	Sport Education and Society	727
3	Physical Education and Sport Pedagogy	502
4	European Physical Education Review	474
5	Quest	281
6	Research Quarterly for Exercise and Sport	156
7	International Journal of Inclusive Education	150
8	European Journal of Special Needs Education	125
9	Palaestra	47
10	Sport, Education and Society	32

Paper

In this study, up to January 2, 2022, the author's metadata results produced by ScientoPy show the top paper written by Donna L. Goodwin and E. Jane Watkinson entitled "Inclusive physical education from the perspective of students with physical disabilities," published in 2000, has 172 citations. This study describes the phenomenon of inclusive physical education from the perspective of students with disabilities. The paper finds that a number of themes emerge that reveal a persistent dichotomy in the minds of students with disabilities in terms of physical education (Goodwin & Watkinson, 2000). There are "good days" and "bad days." Good days are expressed in the themes of belonging, skillful participation, and sharing of benefits. At the same time, bad days are overshadowed by negative feelings expressed in the compositions of social isolation, questionable competence, and limited participation.

Table 7. Most Cited Papers in the Field of Inclusive Education and Physical Education

Title	Authors	Journals	Citations	Years
Inclusive physical education from the perspective of students with physical disabilities	Goodwin, D. L., & Watkinson, E. J.	Adapted Physical Activity Quarterly	172	2000
Inclusive Physical Education: Teachers' views of including pupils with Special Educational Needs and/or disabilities in Physical Education	Morley D., Bailey R., Tan J., & Cooke B.	European Physical Education Review	140	2005
Inclusion in Physical Education: A review of literature	Qi, J., & Ha, A. S.	International Journal of Disability, Development and Education	100	2012
High school general physical education teachers' behaviors and beliefs associated with inclusion	Hodge, S.R., Ammah, J.O.A., Casebolt, K., Lamaster, K., &	Sport, Education and Society	88	2004

Title	Authors	Journals	Citations	Years
	O'Sullivan, M.			
Perspectives of Students with Disabilities Toward Physical Education: A Qualitative Inquiry Review	Haegele, J.A., & Sutherland, S.	Quest	88	2015
The impact of placing pupils with special educational needs in mainstream schools on the achievement of their peers	Kalambouka, A., Farrell, P., Dyson, A., & Kaplan, I.	Educational Research	88	2008
Multiple voices: improving participation of Muslim girls in physical education and school sport	Dagkas, S., Benn, T., & Jawad, H.	Sport, Education and Society	87	2011
Toward progressive inclusion and acceptance: Myth or reality? The inclusion debate and bandwagon discourse	DePauw K.P., & Doll-Tepper G.	Adapted Physical Activity Quarterly	83	2000
Towards a model of talent development in physical education	Bailey, R., & Morley, D.	Sport, Education and Society	83	2006
An inclusive mastery climate intervention and the motor skill development of children with and without disabilities	Valentini, N.C., & Rudisill, M.E.	Adapted Physical Activity Quarterly	81	2004

Author Keyword Analysis

Author keywords are denoted by keywords chosen by authors to neatly describe the content of their document. Most of the authors in the data set examined included their research topic in the keyword document. Author keywords have helped future readers and researchers identify critical ideas and arguments in articles. Countless electronic search engines, databases, and journal sites rely on author keywords to find relevant articles and present them to potential readers. Readers should be aware that keywords generate links to other relevant publications. In this context, ScientoPy can examine the evolution of research topics or search arguments based on the keywords used by the authors.

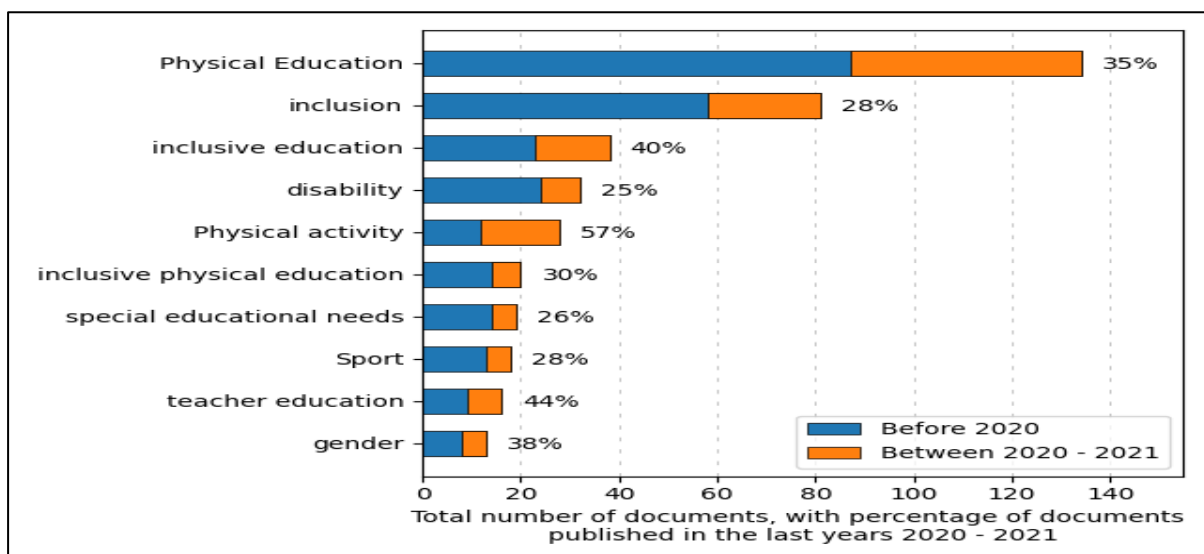


Figure 4. The Top 10 Authors Keywords on Inclusive Education and Physical Education

Figure 4 illustrates the 10 keywords used in the previous research. The most frequently used keywords, as exemplified in Figure 4, are “physical education,” “inclusion,” and “inclusive education.” Data processing provided precedence for these broad terms directly related to the subject. After that, the significant keywords can be accessed to help

future readers and researchers determine which ones to use when analysing the document. Although Figure 4 depicts the first 10 keywords, ScientoPy allows us to see an unlimited number of keywords (Ruiz-Rosero et al., 2019b). Figure 4 also depicts the percentage of documents issued in the previous two years (2020–2021) as a measure of relative growth. With this indicator, we can see that “physical activity” and “teacher education” are the 5th and 9th topics on this list but have the highest PDLY (57% and 44%). It is vibrant that the matter has grown the most among other keywords over the past two years.

In addition, this study uses cluster mapping to determine the co-occurrence of the author’s keywords to identify themes or topics related to inclusive education and physical education. Before creating a network map with VOSviewer, the dataset used was processed with SientoPy (a combination of Scopus and WoS metadata). The frequency with which keywords appear in VOSviewer is proportional to the node’s size (see Figure 5). Simultaneously, bibliographic links are represented by adjacent lines, with the degree of co-occurrence determined by the thickness of the respective lines. Figure 5 depicts the author’s keyword overlay diagram, illustrating their relationship to other keywords using colour, node size, font size, and thickness of connecting lines. In this analysis, the minimum number of keyword occurrences is 10. The yellow nodes in the diagram represent the most recent terms discovered in this study, while the blue nodes represent the older terms that were revealed.

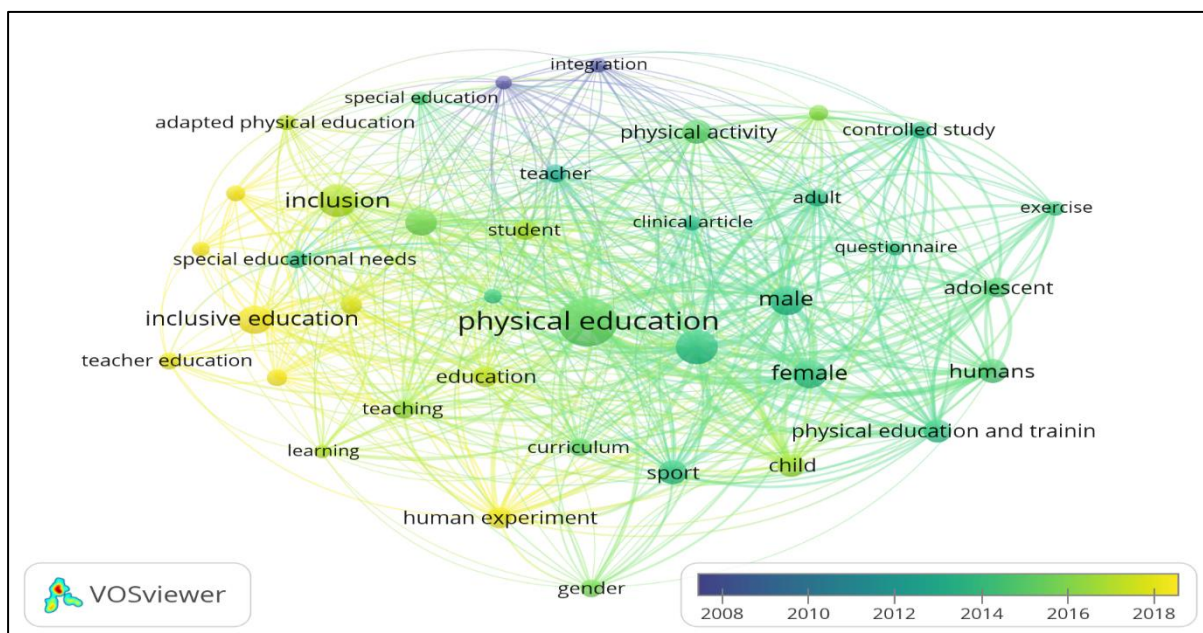


Figure. 5 Overlay Visualisation of the Co-occurrence of Authors’ Keywords

Before exploring the perspectives of students with disabilities on physical education, it is important to understand the context in which they are experienced. Prior to the 1980s, students with disabilities experienced physical education in a separate environment from their peers (Haegle & Sutherland, 2015). We know that Inclusiveness is an educational philosophy of educating individuals with disabilities in the classroom with their peers while providing the necessary support for all students to succeed (Hodge et al., 2012). Most journals discuss inclusiveness, stating that inclusiveness aims to provide services to ensure that all students, regardless of ability, can reach their full potential in an appropriate educational environment (O’Brien et al., 2009).

Inclusive education takes on the responsibility of children to adapt their learning styles and expects educators to provide diverse learning content and promote the abilities of all

students (Coates, 2012). And we also know that the inclusive physical education implemented has proven to positively influence the social skills, attitudes, and awareness of individuals with disabilities and the leadership of students with disabilities and people with disabilities (Grenier et al., 2014). Journals and authors have also discussed the experience of implementing physical education among students with disabilities, involving stakeholders such as parents and students' peers.

Recent studies have shown that nearly half (49%) of published studies that explore students' perceptions of physical education do so from a teacher's perspective (Qi & Ha, 2012). The findings reveal that while physical education teachers philosophically support inclusion in physical education, they express various concerns about its practicality and usefulness (Qi & Ha, 2012). Several variables were identified that influence teachers' attitudes towards students with disabilities: degree of disability, type of disability, gender of teacher, and level of experience (Qi & Ha, 2012). Further qualitative studies related to teacher attitudes are needed to address certain individual variables and contextual variables that can explain teachers' attitudes and views towards teaching students with disabilities (Qi & Ha, 2012).

The most common perspective explored by students with disabilities relates to interactions with their peers. Students with disabilities educated in physical education with peers may have more social interactions with teaching assistants or teachers than peers of the same age (Haegele & Sutherland, 2015). However, peer interaction is seen by students with disabilities as significant to their sense of belonging to physical education activities (Spencer-Cavaliere & Watkinson, 2010). In exploring past studies, the subthemes concerning peer interaction included (a) positive interactions in physical education and (b) negative interactions in physical education. Several studies included in this review provide evidence of positive peer interaction in physical education. Perceptions of positive interactions in physical education can contribute to the potential of physical education to become a friendship mechanism (Healy et al., 2013).

Most studies on the physical education experience for individuals with disabilities come from the teacher's perspective (Qi & Ha, 2012). Interestingly, participants in several studies reported strong perceptions of teachers. Students believe that teachers influence participation in activities (Bredahl, 2013), and social value in participating in diverse sports (Fitzgerald, 2012). Interactions with teachers were seen to have a positive or negative effect on a person's perspective on their participation in physical education. The author agrees with Fitzgerald (2012), for it is ironic that researchers exploring the views of individuals with inclusive physical education tend to use proprietary data generation methodologies and may not consider ways to make their research more inclusive.

CONCLUSION

This study provides a better understanding of how physical education is implemented for students with disabilities and illustrates the importance of inclusive practices in the physical education curriculum. By emphasising the role of inclusive education in promoting equality, diversity, and overall well-being among students, this research contributes to the ongoing discourse on the establishment of inclusive environments in educational settings. Furthermore, it offers a deeper understanding of the strength of evidence concerning specific stakeholders, especially the attitudes of teachers and peers towards inclusivity. Understanding these attitudes is critical to developing effective strategies to support the participation and integration of students with disabilities in physical education activities.

The comprehensive scientometric analysis conducted in this study offers a valuable overview of the scientific landscape and emerging trends in the fields of inclusive

education and physical education. By identifying key contributors, influential works, and dominating themes, this analysis not only highlights the existing body of knowledge, but also provides a basis for future research and policy development. The findings from this study emphasise the importance of ongoing research efforts to improve inclusive practices in physical education for students with disabilities. By expanding the domain of adaptive physical education and advocating for inclusive policies and practices, educators and policymakers can work towards the creation of more equitable and inclusive learning environments for all students.

However, it should be recognised that this study has some limitations. The focus on scientometric analyses may have limited a deeper understanding of the individual experiences of students with disabilities in the context of physical education. In addition, the use of two specific databases and language restrictions may have overlooked important contributions from research published outside the range of the selected databases and in languages other than English. For future research, it is recommended to broaden the scope of the methodology by integrating case studies and qualitative research that can provide deeper insights into the experiences of students with disabilities in physical education. In addition, it is recommended to consider using broader data sources and cross-cultural approaches to understand variations in inclusive practices around the world. Moreover, recommendations for future research include an in-depth evaluation of the implementation of inclusive education policies and the identification of barriers that may be faced in realising a more inclusive learning environment for students with disabilities. By conducting more holistic and multidisciplinary research, educators and policymakers can strengthen their efforts to create more equitable, inclusive, and beneficial learning environments for all students.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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