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A BIBLIOMETRIC STUDY ON SPECIAL EDUCATIONAL NEEDS (SEN): THE GROWTH TRAJECTORY

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ABSTRACT

Students with special educational needs (SEN) are the ones who struggle more than most kids their age to study or access education because of their disabilities or learning challenges. Since SEN became an official research topic in 1971, its significance in scholarly discussions has expanded tremendously, which has led to an increase in its research output. The database Web of Science, for example, has 4057 publications related to the subject of SEN. This study uses the core database in WOS as a data source and screens 2599 of these high-quality publications (including articles, conference papers, and reviews) to summarize the growth trajectory of the SEN field. Two key findings were identified. First, the global publication trend reveals a rise in scholarly interest in SEN research, with an especially noticeable increase in publications since 2005. While SEN research have been slowly rising across Asia over decades, this tendency became more obvious in 2013. Second, there has been a growth in keywords related to SEN provision in both global and Asian trend patterns.

Keywords: Special Educational Needs (SEN), Bibliometric analysis, Web of Science (WOS), The Growth Trajectory and Future Preview

INTRODUCTION

Special educational needs (SEN) covers various learning challenges and has varying meanings for distinct individuals depending on their context. It encompasses a wide range of issues, from those

connected to specific impairments to those related to academic and behavioral challenges faced by some students in comparison to other students of a similar background (Davis & Florian, 2004). According to Gulliford and Upton (2002), there are many types of SEN, such as severe learning difficulties, emotional and behavioral difficulties, speech and language difficulties, visual impairments, hearing impairments, physical disabilities, and psychological and zahealth-related problems, multi-sensory impairments. Since SEN became an official field of study in 1971, its impact on the scientific conversation has grown tremendously, which has increased the volume of its research.

Special educational needs (SEN) have been the subject of substantial research for more than 50 years in a variety of academic fields, such as special education (Klimecká, 2023; Lindner et al., 2023), psychology education (Schütz et al., 2022; Marku et al., 2022), and rehabilitation (Vasylenko et al., 2022; Tso et al., 2022). As a result, there are currently a lot of empirical papers on SEN, which also serve as the foundation for research-based publications on SEN. For instance, the Web of Science (WOS) database initially contains 4057 publications in the topic of SEN from the past 52 years (1971–2023), including 270 research articles. After completing the advanced search (limiting the search criteria, e.g., removing "SEND"; articles, conferences, and research articles only), there were still 3806 publications, including 99 research articles. However, among the 99 research articles, more than 90% of the literature was reviewed using qualitative methods (e.g., narrative literature review and systematic literature review), and only nearly 10% was reviewed using quantitative methods (eg., meta-analysis and bibliometric analysis).

However, there is currently a lack of bibliometrically informed literature review research in the area of SEN, and the previous literature reviews on SEN differing from my study (See some examples in Table 1). For instance, Hassani and Schwab's evaluation (2021) is a meta-analysis and comprehensive review of the prior research (314 publications related to SEN). Additionally, the study's scope is restricted to examining the efficacy of treatments in social and emotional learning for students with special educational needs, the insights offered only span the years 1994 to 2020. Szumski's (2017) review is a meta-analysis of 45 articles that examine the effects of SEN kids in the classroom on non-SEN pupils. As a result, due to the study's narrow scope, only a small number of articles covering the last ten years offered insights. Rix et al. (2013) reviewed 341 publications related to policy description and theory reflection to explore the SEN provision for Children. 37 papers were assessed in a comprehensive literature review by Dell'Anna et al. (2019) that looked at the experiences and educational outcomes of students in inclusive education. The earlier original review by Schuengel et al. (2019) included 108 publications and was a systematic literature review and bibliometric analysis to allow word co-occurrence analysis with VOSviewer. To organize the subjects and themes of early development longitudinal investigations. Overall, the qualitative literature review has significantly fewer data sources than the quantitative literature review. The scope of earlier literature review research is considerably smaller than that of this study.

Table 1 Summary of Five Typical Literature Reviews on SEN (2005–2023)

Citation	Article Title	Journal Title	Review Type	Scope of the Review	Review Period	Data
Hassani & Schwab, (2021)	Social-Emotional Learning Interventions for Students With Special Educational Needs: A Systematic Literature Review	Frontiers in Education	Past Meta-analysis And Systematic LR	Effectiveness of social-emotional learning interventions	1994–2020	314
Szumski (2017)	Academic achievement of students without special educational needs in inclusive classrooms: A meta-analysis	Educational Research Review	Meta-analysis	How students with SEN in the classroom impacts students without SEN	Not Mentioned	45
Rix et al. (2013)	Exploring provision for children identified with special educational needs: an international review of policy and practice	European Journal of Special Needs Education	Systematic LR	SEN provision: policy and practice	Not Mentioned	65
Dell’Anna et al. (2019)	Experiences and learning outcomes of students without special educational needs in inclusive settings: a systematic review	International Journal of Inclusive Education	Systematic LR	Inclusive educational students’ Experiences and learning outcomes	Not Mentioned	37
Schuengel et al. (2019)	Impact of Research About the Early Development of Children With Intellectual Disability: A Science Mapping Analysis	Frontiers in Education	Systematic LR and Bibliometric Analysis	Early Development of Children with Intellectual Disability	Published before 2018	108

In addition, even though this information is valuable for scholars and policymakers because it gives them a deeper understanding of the current state of knowledge in the field as well as its scope and future trends, there is a lack of in-depth exploration and comparison of key authors, institutions, countries and regions, and scientific information on SEN topics from all previous empirical and research-based studies (Agarwal et al. 2023). By extracting bibliographical data, bibliometrics, is able to provide an in-depth examination and illustration of the aforementioned problems. It reveals new areas of the field while allowing us to explore the subtleties of a particular field's evolution (Donthu et al., 2021). Using quantitative and statistical techniques, it has the analytical capacity to process and examine enormous corpora of scientific literature (Mukherjee et al., 2022).

Hence, this systematic review attempted to run bibliometric analysis to assess the and future predictions of the SEN field. Metadata were obtained from 3806 Web of Science (WOS) indexed works examining SEN (including only articles, conferences, and review articles in the WOS core repository), published from 1977 to 2023. Moreover, the goal of this study's supervision is to (i) aid SEN academics and industry participants in their understanding of the structure and growth of the SEN body of knowledge, and (ii) motivate researchers to pursue an agenda of intellectual advancement in future SEN research. Thus the data sources for this study were limited to the areas of the WOS related to education, such as education educational research, education special, psychology education, and education scientific disciplines. Therefore, this study mainly responds to the following research question: *What is the the growth trajectory of SEN field?*

The remainder of the essay is structured as follows. The theoretical framework of this paper is described in Section 2. The review approach utilized in the current study is disclosed in section 3. The review's findings are presented in Section 4, and a discussion of them is presented in Section 5. The study is summarized in Section 6.

Theoretical Framework (TSD)

The theory of scientific discovery (TSD) by Chen et al. (2009) serves as the foundation for this study. TSD is based on a topic that keeps coming up in the information sciences, philosophy of science, sociology of science, social network analysis, and various theories of scientific discovery, change, and diffusion (Chen et al., 2009). The fundamental tenet of TSD is a transformational discovery happens when a new connection is formed between two or more previously unrelated scientific knowledge units (Chen et al., 2009). Burst detection is used to spot changes in a variable over time in comparison to other variables in the same group (Kleinberg, 2002). When detected a citation burst in a research area may be a reliable sign of a transformational discovery, particularly from the perspective of profitability-guided foraging (Chen et al., 2009). Therefore, burst detection was used in the current study to uncover the history of keywords related to special educational needs (SEN) that had experienced a burst and to foretell the transformational discovery in the SEN sector.

METHODOLOGY

Using 46 years (1977-2023) of metadata retrieved from the Web of Science (WOS) database, a bibliometric technique was used in this work to review the research literature on SEN. Figure 3 depicts the methodology employed in this study, which is further explained in the following below (3.1 Dataset Generation and 3.2 Data Analysis).

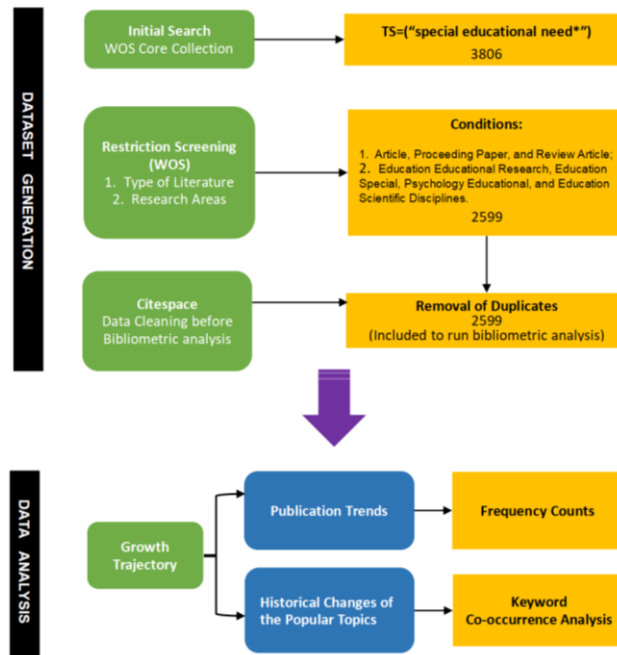
Dataset Generation

By searching the Web of Science (WOS) database for articles on the topic of special educational needs (SEN), this study created a dataset on SEN during the last 46 years. The search, which comprised articles, conference papers, and a review of the literature published between 1977 and 2023, was done on April 9, 2023. The initial search was restricted to a topic search using the search criteria: TS=("special educational need*"), title, abstract, and keyword fields. 3806 documents were found after this search. Then, the restricted filtering function of WOS was used to limit the literature to two conditions: 1. the types of the literature to include only Article, Proceeding Paper, and Review Article; and 2. to show only publications in the field of educational research (Education Educational Research, Education Special, Psychology Educational, and Education Scientific Disciplines). Yielding a dataset of 2599 documents. Finally, a dataset of 2599 documents was obtained for a series of following operations on bibliometric analysis right away after utilizing the data cleaning program in Citespace to remove duplicates.

Data Analysis

There are two steps in the data analysis procedure used to determine the growth trajectory and future preview of SEN field. Step one, growth trajectory. The growth trajectory of SEN research over the past 46 years is described by the frequency of publication per year. Step two, future preview. The CiteSpace 6.2.1 was used to run the keyword co-occurrence analysis, which is one of famous bibliometric analysis technique (Chen, 2015). The results of keyword co-occurrence would be used to discuss the research gap and the revolution of the keywords.

Figure 1 *Conceptual Framework*



RESULTS

The Publication Trend of SEN Research

Figure 2 depicts the growth trajectory in the SEN area from two main perspectives: Asia (Folding line Chart) and Global (Bar Chart and Index). From the Global perspective, a total of 2599 documents published between 1977 and 2023 and registered for the present study were retrieved to analyze the publication pattern. Articles (n = 1991), research articles (n = 94), and conference papers (n = 514) were the three different document kinds that were recovered. To examine the publication pattern from an Asian viewpoint, a total of 257 documents that were registered for the study and published between 1994 and 2023 were retrieved. Three separate document types were found: articles (n = 184), research articles (n = 34), and conference papers (n = 39).

Global trend

The global trend demonstrates a long-term, moderate increase in publications and publications in the field of SEN. The first paper on SEN was published in 1977, and the subsequent article was published in 1981, according to a thorough analysis of these tendencies. After 2005, the growth of SEN-related publications tends to accelerate, reaching a high (282 articles) between 2019 and 2020. Before 2005, the expansion of papers pertaining to SEN tended to plateau or show little variation. As a result, more than half of the articles were published between 2005 and 2023, indicating that SEN research is gaining more attention from academics. Further corroborating the observation of exponential growth is the trend line in Figure 2 with an R^2 of 0.89, which is the outcome of regressing the number of publications on time using the exponential model specification in Microsoft Excel. It is interesting that the study specified at the outset of the database building that all articles be connected to the field of education.

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As a result, the dual overlay in Figure 3 reveals that the majority of the SEN papers published in the study dealt with psychology, education, and health.

Asian trend

The overall Asian trend indicates a long-term, slow expansion of publications and articles in the SEN sector. An in-depth examination of these tendencies revealed that the first publication on SEN appeared in 1994 and that additional pieces appeared in 2000. After 2013, the growth of publications relating to special education usually picks up. In Asia, the annual publication volume peaks between 2019 and 2020 (46 articles), similar to the global average. Up until 2013, the quantity of SEN-related publications published tended to be zero or fluctuated very slightly. More than half of the publications were only released between 2013 and 2023.

Figure 2 Publication Trend

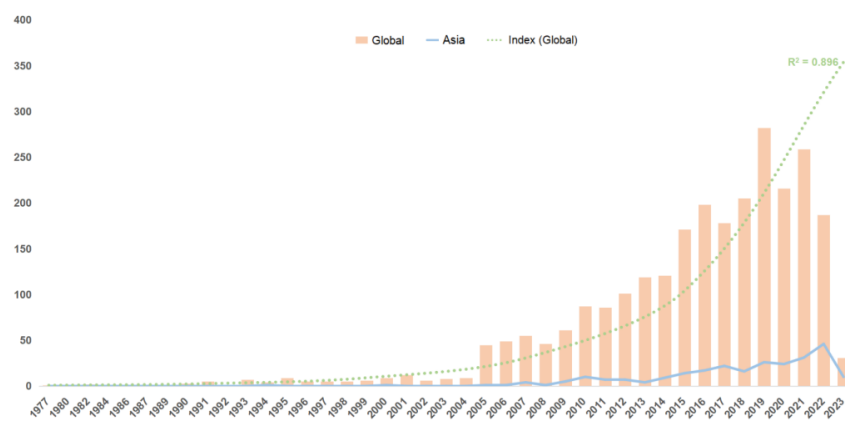
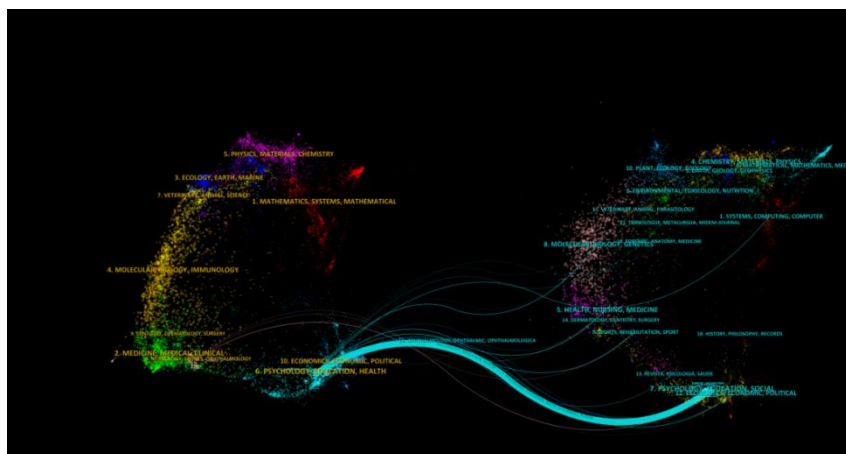


Figure 3 Dual-Overlay Map (Major Research Disciplines)



Historical Changes of the Popular Topics in SEN Field

In order to compare the difference on the burst history of SEN related Keywords between Global and Asia. The keyword co-occurrence analysis has been run twice, one was for the whole 2599 publications pattern of Global and another was for the 257 publications pattern of Asia. According to Chen (2015), keyword with a burst in usage are signs of hot topics, which presents potentially significant temporarily. Hence, the growth trend of hot topics in SEN field would revealed via the results of burst history of Keywords. For the purpose of detecting multiple bursts, the minimum burst duration was set at 3. The frequency of a keyword may be a good indicator of its popularity. A keyword's increase in frequency is a sign of interest dynamics based on the same concept as the citation burst. As seen in Figures 4 and 5, a portion of the red line represents the frequency of a burst.

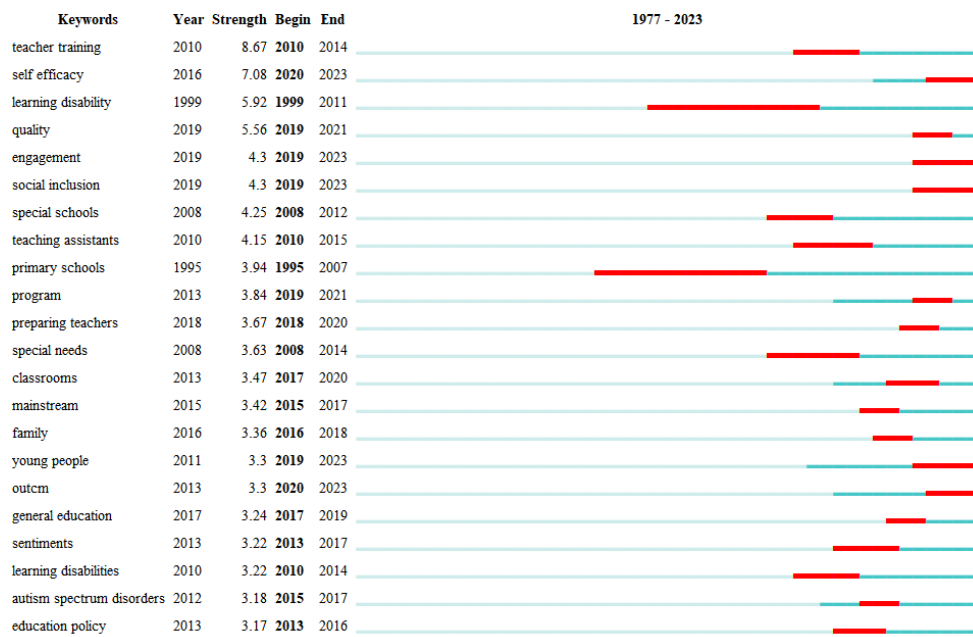
Global trend

Figure 4 showed the 24 top keywords with the strongest citation bursts from the publication pattern of Global. According to the findings, the frequency of *learning disabilities* (1999–2011), *primary schools* (1995–2007), *teaching assistants* (2010–2015), and *special needs* (2008–2014) increased over a five-year period. Next keywords all increased in a four-year period, such as *teacher training* (2010-2014), *engagement* (2019-2023), *social inclusion* (2019-2023), *special schools* (2008-2012), *preparing teachers* (2018-2020), *young people* (2019-2023), *sentiments* (2013-2017), *learning disabilities* (2010-2014). In addition, the popularity of the rest keywords last 3 or 2 years, such as *self-efficacy* (2020-2023), *education policy* (2013-2016), *quality* (2019-2021), *family* (2016-2018), *outcome* (2020-2023), *program* (2019-2021), *mainstream* (2015-2017), *general education* (2017-2019), and *autism spectrum disorders* (2015-2017).

Accordingly, the keyword *learning disabilities* has seen two surges, the duration from 1999 to 2011, and the duration from 2010 to 2014. Thus, *learning disabilities* actually popular during the time 1999 to 2014, which is the topic that has held the longest research interest among scholars in the field of SEN. Notably, six keywords—including *engagement*, *social inclusion*, *young people*, *self-efficacy*, and *outcomes*—are the newest hot topics in SEN studies and could lead to a transformational discovery of future research in the field. However, some trending topics have only fleetingly surfaced in the tide of SEN study and have since vanished off the history stage, such as *quality*, *program*, *preparing teachers*, and *general education*.

Figure 4 The resultant visualization of burst history of Keywords (Global)

Top 24 Keywords with the Strongest Citation Bursts



Note: K = 10, n=360, LRF = 3.0, L/N =10, LBY = 5, e = 1.0; Y [0,1] = 0.8, Minimum Duration = 3.

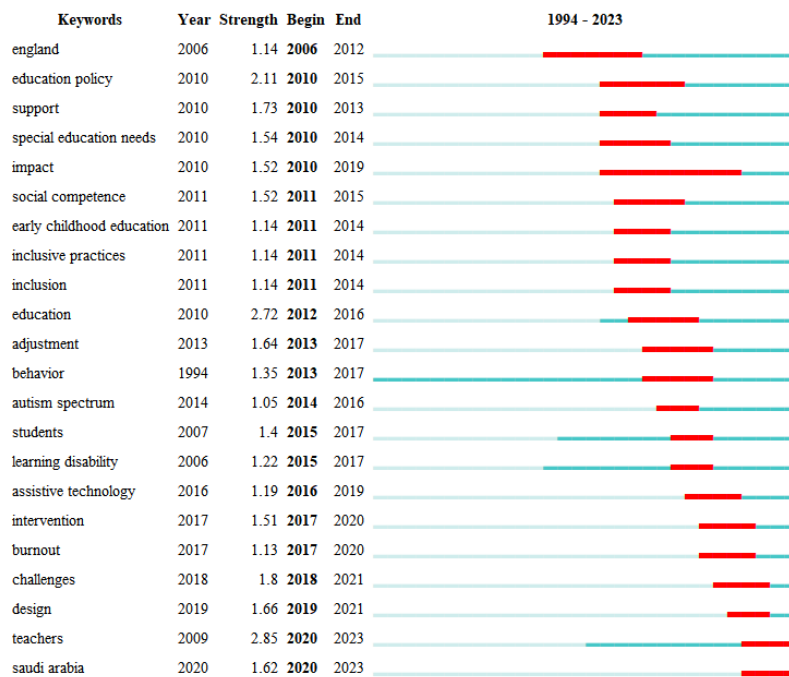
Asian trend

Figure 5 displayed the top 22 keywords from the Asian publication pattern with the strongest citation bursts. The results show that over a five-year period, the frequency of *England* (2006-2012), education policy (2010-2015), and impact (2010-2019) all rose. Next keywords all increased in a four-year period, such as *special education needs* (2010-2014), *social competence* (2011-2015), *education* (2012-2016), *adjustment* (2013-2017), and *behavior* (2013-2017). In addition, the popularity of the rest keywords last 3 or 2 years, such as *support* (2010-2013), *early childhood education* (2011-2014), *inclusive practices* (2011-2014), *inclusion* (2011-2014), *autism spectrum* (2014-2016), *students* (2015-2017), *learning disability* (2015-2017), *assistive technology* (2017-2019), *intervention* (2017-2020), *challenges* (2018-2021), *design* (2019-2021), *teachers* (2020-2023), and *Saudi Arabia* (2020-2023).

Accordingly, only two keywords *learning disabilities* and *education policy* has seen in both trending pattern of Global and Asia. Differing from the global trending, among the hot topics in the trending pattern of Asia, *England* and *Saudi Arabia* are the only hot topics focused on countries. Teachers and Saudi Arabia are the newest hot topics in the SEN field for Asia areas, which could indicating a rapid transformational discovery of future SEN research in this aforementioned country. However, some trending topics have only fleetingly surfaced in the tide of SEN study and have since vanished off the history stage, such as *autism spectrum*, *students* and *learning disability*.

Figure 5 Revolution of Keywords (Asia)

Top 22 Keywords with the Strongest Citation Bursts



Note: **K** = 25, n=360, **LRF** = 3.0, L/N =10, **LB**Y = 5, e = 1.0; Y[0,1] = 0.3, Minimum Duration = 3.

DISCUSSION

The goal of this bibliometric analysis was to map the growth trajectory of SEN-related literature that was accessible in the WOS database between 1977 and 2023. Thus, the study offers pertinent insights about the publication trends and the historical changes of the popular topics in SEN field.

The Publication Trend of SEN Research

Overall, the global publication pattern indicates an increasing academic interest in SEN research, and since 2005, there has been a more noticeable increase in publications. Four reasons may cause the growth of SEN publications. First, this is a result of the enormous changes in how persons with disabilities and students who struggle in school have been and are now treated in society (Cline & Frederickson, 2009). For the past 40 years, researchers have debated the best ways to inform the public about diversity, equity, and inclusion in order to address this challenge (Gause 2011). Second, UN advocacy: The United Nations has promoted the right to special educational needs in a number of documents, including *the 1989 Convention on the Rights of the Child* (Unicef, 1989) and *the 2006 Convention on the Rights of Persons with Disabilities*, which has helped to establish a global consensus on this issue (Assembly, 2006). Third, the emergence of new journals (e.g., *the International Journal of Inclusive Education*, *the Journal of Research in Special Educational Needs*, and *the International Journal of Special Education*) publishing research on SEN in the early years of the twenty-first century (Daniel et al., 2020). Fourth, the contribution of a number of particularly prolific authors and institutions studying SEN, and the increasingly close collaboration between them.

In general, SEN-related publications in Asia have grown slowly over a long period of time, but after 2013, this trend became more evident. One crucial reason for This occurrence is that SEN research

in Asia deeply affected by the depth and growth of SEN research in Europe, particularly in the England. From Figure 5, one hot topic of SEN-related researches in Asia is England. In addition to laying the groundwork for legislation like the Children and Families Act 2014 and the Education Act 1981, The Warnock Commission's report on "Special Educational Needs" has had a significant impact on the development of SEN policy and practise at local, national, and international levels since 1978 (Lindsay et al., 2020). Additionally, in 1994 the UK government published the first Code of Practice on Special Educational Needs (Department for Education, 1994), which served as a guide for parents, professionals, LEAs, and school governing bodies regarding how to interpret and apply SEN legislation. In addition to medical advice, educational counsel, and psychological help from educational psychologists, the Code also provides guidelines on parents' 'advice'-giving responsibilities (Lindsay et al., 2020). Furthermore, the first piece about SEN in Asia that appeared on WOS was only published in 1994. It's an investigation on 20 boys and 5 girls aged 6;0 to 11;8 years, Lai et al. (1994) employed a structured evaluation approach to assess cognitive impairment in Silver-Russell syndrome patients.

The Historical Changes of the Popular Topics in SEN field

In both the global and Asian trend patterns, the keywords *learning disabilities* and *education policy* have shown sustained increases. This is not difficult to understand, students with special educational needs (SEN) are the ones who struggle more than most kids their age to study or access education because of their disabilities or learning challenges (Hodkinson, 2019); thus, one of the criteria for measuring whether a student has special educational needs is whether the student has a learning disability. Furthermore, educational policy is crucial to special education because it establishes rules and guidelines that guarantee that students with disabilities receive the assistance and services they require to succeed in school (Brown, 2012). It also makes sure that disabled pupils receive the same educational chances as their counterparts without disabilities and are not subjected to any form of discrimination (Smith, 2004). However, each country should learn from the best practices of other nations while also taking into consideration its unique circumstances and crafting a locally appropriate strategy for the development of special education, because educational policies are specific, time-sensitive, and territorial.

Additionally, there has been a burst in SEN provision-related keywords in both global and Asian trend patterns, such as: *teacher training*, *social inclusions*, *special schools*, *teaching assistants*, *preparing teachers*, *general education*, *inclusive practices*, *mainstream* and *inclusion*. This is due to the fact that the provision of SEN has long been a challenging and well-liked research subject in SEN studies. It has proven difficult to build SEN provision within schools and to provide kids with special needs with higher-quality, more productive education. For example, *the role of co-ordinator for students with SEN* (e.g., Burnett, 2013; Done et al., 2022). Research has indicated that a variety of factors, including the current school culture, resources, the level of SLT support, and membership, limit the ability of SENCOs to drive reform at the school level (Done et al., 2022).

Practices of parental participation. To effectively execute school policy, parents must collaborate closely with school personnel. According to research, schools can collaborate with parents to create blended models of in-person and online learning to provide SEN students with a more fair and inclusive education (Shaw & Shaw, 2023). *Educating students with SEN in regular, special, or inclusive classrooms.* The majority of children receive an effective education in regular classes, which also boosts

the effectiveness and, eventually, economy of the entire educational system. However, separate from the instruction given to everyone else, special classrooms were where special needs education took place. A facility that offers inclusive education is known as an inclusive classroom, where anyone who might otherwise be denied admission to or excluded from a country's general educational system is now included (Florian, 2019). It is important to note that the Salamanca Statement (UNESCO, 1994), which advocates for all children to receive an education in an inclusive system, challenges the pervasive notion that students with special needs are not welcome in regular classrooms or the general education programme.

Notably, the most recent hot issues in the global pattern of SEN research are *engagement, social inclusion, young people, self-efficacy, and outcomes*; while, the most recent hot topics in the SEN field for Asia regions are teachers and Saudi Arabia. These trending subjects could all result in a transformational discovery for SEN research in the future. However, certain hot topics, such as *quality, program, preparing teachers, and general education (Global pattern); autism spectrum, students, and learning disability (Asian pattern)*, have only briefly surfaced in the tide of SEN studies and have since disappeared off the history stage.

CONCLUSION

This bibliometric study uses the core database in Web of Science (WOS) as a data source and screens 2599 of these high-quality publications (including articles, conference papers, and reviews) to summarize the growth trajectory of the SEN field. The frequency counting and keyword co-occurrence analysis were used to analyze the publication trend and the historical changes of the popular topics in SEN field, individually. Two primary findings were revealed, first, the Global publication pattern shows a growing academic interest in SEN research, with a more pronounced increase in publications since 2005. While SEN-related articles have quietly increased throughout Asia over time, in 2013 this trend became more pronounced. Second, both global and Asian trend patterns have seen an increase in keywords relating to SEN provision. Notably, the most recent hot topics in the SEN field are *teachers and Saudi Arabia (Asian pattern)*, social inclusion, young people, self-efficacy, and outcome (Global pattern).

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