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Response to Intervention: A Bibliometric Mapping

Arzu Doğanay-Bilgi [1] | | arzudb@gazi.edu.tr
Gazi University, Faculty of Education, Department of Special Education, Ankara, Türkiye
Eylem Dayı | | eylemd@gazi.edu.tr
Gazi University, Faculty of Education, Department of Special Education, Ankara, Türkiye
Çetin Toraman | | cetintoraman@comu.edu.tr
Çanakkale Onsekiz Mart University, Department of Medical Education, Çanakkale, Türkiye

Abstract
This study aims to present a bibliometric analysis of international research on the response to intervention (RTI) approach. An analysis was conducted using the Web of Science database focusing on the period between 1997 and 2023. At the end of this analysis, 477 records that met the search criteria were identified.
Initially, a performance analysis was carried out to assess the publication output of authors, institutions, countries, and other contributors. Subsequently, a science mapping analysis was conducted to uncover the structure and dynamics of research related to the RTI approach. The main findings of the research are as follows: (1) Research on RTI has been an emerging field that has grown exponentially since the 2000s, but there has been a decline in the number of studies in recent years; (2) Research in this area is predominantly produced by a few institutions and a cadre of scholars in the United States; (3) There is evidence of research collaboration among scholars in this area, but collaborative networks are mostly established within the US or among scientists in a few countries; (4) The trends in the RTI literature have changed over the past 27 years. This study provides beneficial information on the current state of RTI research, helping to recognize this research's strengths and gaps in growth, development, themes, impact, and scope.

Keywords: Response to Intervention, Learning Disabilities, Bibliometric Study, Special Education

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[1] Corresponding Author

Introduction

Researching effective strategies to address students' diverse learning needs is a fundamental issue in education. Education systems worldwide aim to provide every student with the necessary support to unlock their full academic potential. One innovative and widely adopted approach to achieve this goal is Response to Intervention (RTI), a multi-tiered system of support that focuses on early identification and intervention for students struggling academically or behaviorally (Abbott & Wills, 2012; Fletcher & Vaughn, 2009; Hughes & Dexter, 2011).

RTI emerged due to the search for improved methods of identifying and supporting students with learning disabilities. The acronym RTI has been used for more than twenty-five years to represent a variety of terms, including "responsiveness to intervention," "response to intervention," and "response to instruction" (Allsopp et al., 2010; Fuchs et al., 2003; Speece & Case, 2001; Vaughn et al., 2003). The term RTI originally referred to a diagnostic method for addressing reading difficulties, which includes concise, intensive instruction and evaluating the student's progress in response to that instruction (e.g., Fuchs & Fuchs, 1998; Torgesen et al., 1999). Previously, the "wait-to-fail" approach was the widely accepted model for identifying students with learning disabilities. In this model, special education services or interventions are generally not initiated until students demonstrate significant academic failure or a significant gap between their intellectual abilities and academic achievement (Fuchs & Fuchs, 2006). The existence of a significant difference between intellectual ability and academic achievement is considered an indicator of a learning disability. The "expect to fail" approach has been subject to severe criticism, including (a) delay in intervention (Fletcher et al., 2007), (b) ignoring the difficulties of students from different backgrounds and students with mild learning disabilities until they become severe (Reynolds & Shaywitz, 2009), and (c) although early intervention and preventive measures are effective in preventing learning difficulties and reducing their effects, the model contradicts this finding (Fuchs & Fuchs, 2006). As educational practices have evolved, the importance of proactively addressing learning disabilities and providing timely support to ensure all students succeed academically has been recognized, resulting in a shift towards early intervention models such as RTI. The logic behind RTI centers on providing timely and effective support to struggling students using a systematic, data-driven approach. By identifying issues early, implementing gradual interventions, making decisions based on data, fostering collaboration, and maintaining flexibility, RTI aims to ensure that all students have the opportunity to succeed academically. In RTI, only students who fail to show expected academic progress or do not make any progress despite being provided with appropriate teaching opportunities are referred for diagnosis (Fuchs & Fuchs, 2006; Gresham, 2002; Vaughn & Fuchs, 2003). In this context, RTI is a preventive approach that aims to take measures to prevent failure (Lonigan & Phillips, 2016).

RTI is currently defined as a multi-layered approach to early identification and support of students with learning and behavioral needs (http://www.rtinetwork.org). The fundamental feature of the RTI approach is to provide high-quality instruction and evidence-based interventions while monitoring and maintaining data on each student's progress (Grether & Sickman, 2008). Its framework covers several key components, each essential to its effectiveness. The first of these is *universal screening*. The RTI process begins with universal screening of all students in the general education classroom to identify students at risk for learning disabilities (Batsche et al., 2005). Universal screening involves regularly assessing all students to identify those at risk and to monitor their academic progress over time. All students are regularly assessed to ensure that they are making adequate progress in the general education curriculum. Based on the data obtained, valid and reliable decisions can be made regarding students' intervention needs and the intensity of support to be provided (Shinn, 2008). The second component, *gradual interventions*, determines the type and intensity of support per student's needs as an essential feature of a multi-tiered support system (Pretti-Frontczak et al., 2014). RTI uses a tiered approach to support students identified at risk of learning disabilities, with interventions provided at increasing intensity levels to promote their learning rate. This layered structure confirms that students receive interventions appropriate to their needs (Vaughn & Fletcher, 2012). Educational decisions about the intensity and duration of interventions at each level are based on the student's response to instruction. RTI has a widely accepted three-tier structure (Berkeley et al., 2009; Björn et al., 2018; Wanzek & Vaughn, 2011). Tier 1 involves general instruction for all students and is intended to ensure access to the universal curriculum. Instructional strategies at Tier 1 are intended to determine school or classroom performance and to monitor it to identify students who fall below the universal curriculum performance, that is, students in the risk group who need additional support. At this stage, the student's response to in-class interventions is monitored for three time points. At the end of the evaluations, students who cannot demonstrate sufficient development in the expected knowledge and skills compared to their peers are directed to Tier 2, which includes individualized interventions and more comprehensive evaluations with the universal curriculum. Tier 2 interventions are performed either in small groups or through peer teaching, and their duration varies depending

on the planned intervention (Compton et al., 2006; Fuchs & Fuchs, 2006). Again, the duration of the intervention is planned against the data collected. When the student reaches class performance with the support received at Tier 2, they continue to be monitored in the classroom, and support is continued if necessary. Students who do not adequately respond to the intervention at this stage are transferred to Tier 3, and more intensive and individualized interventions are provided. At this stage, students who do not respond effectively to target-oriented interventions are directed to receive diagnostic and special education services (Fuchs & Fuchs, 2006). Moreover, RTI keeps monitoring student progress; regular data collection allows educators to monitor the impact of interventions and make informed instructional decisions (Deno, 2003). The final component of RTI is *data-based decision-making*. Educators use collected data to tailor student interventions and instructional strategies (Stecker et al., 2005).

When the national and political popularity of RTI in the United States is considered, an increasing trend that can be attributed to several factors is observed. The historical context of inclusion of disabilities in schools, along with the evolution of RTI as a model designed to enhance academic performance among all students, have played a significant role in its growing prominence (Leung, 2021). One key factor is the recognition that appropriate instruction can significantly influence the learning trajectory of individual students (Scanlon et al., 2008). Research has shown that many students who are currently identified as having learning disabilities could have avoided such classification if they had received more targeted and responsive interventions (Scanlon et al., 2008). Additionally, studies have demonstrated a decline in special education classification rates after the implementation of a tiered approach to interventions, a common RTI model (Scanlon et al., 2008).

The potential of RTI to serve as a prevention framework, encompassing universal screening, tiered instruction, and a teach-test-reteach approach, has also contributed to its increasing popularity (Ehren & Nelson, 2005). Furthermore, the utility of RTI in addressing not only learning disabilities but also language impairments has expanded the scope of its application and appeal (Ehren & Nelson, 2005).

The recognition of the need to consider intersectionality and equity when examining learning disabilities in schools has also played a role in the growing popularity of RTI (Leung, 2021). The disproportionate representation of culturally and linguistically diverse students in special education suggests the importance of addressing social factors that may contribute to this disparity (Leung, 2021).

To date, various meta-analyses (e.g., Burns et al., 2005; Marston, 2005; Swanson et al., 2017; Tran et al., 2011) and literature reviews (e.g., Alahmari, 2019; Gischlar et al., 2019) have been conducted to understand the nature of RTI and its application effects. These studies have examined the themes, methodologies, theoretical foundations, and applications of RTI research, providing essential insights. However, no research has mapped the evolution of RTI research, identified the key researchers, established collaborations, co-authorships, or institutional affiliations based on publication data.

The purpose of this study is to provide researchers with a quantitative analysis that maps the scientific output related to RTI, enabling them to understand, assess, and direct the research dynamics in this field. For this reason, the annual publication data, key journals and publications, leading authors, institutions, countries, and their collaborative networks, as well as trends in common words, are analyzed. It considers author, publication, keyword, journal, country, university, and citation variables. The objective is to provide a comprehensive overview of the current state and development of RTI research from 1997 to 2023.

Method

This study overviews and examines "response to intervention" research using bibliometric methods. Bibliometric methods employ a quantitative approach for the description, evaluation, and monitoring of published research (Zupic & Čater, 2015). The purpose of bibliometrics is basically to investigate scientific literature in a particular field. It has broad applicability to all fields of science; Pritchard coined the term bibliometrics in 1969 (Andrés, 2009). Bibliometric analysis is divided into 4 sub-analyses: descriptive, conceptual structure, intellectual structure, and social structure (Prieto-Jiménez, 2021). The descriptive analysis focused on identifying the most productive authors, institutions, countries, influential documents, frequently cited references and common keywords. The conceptual structure was examined using co-word analysis. In contrast, the intellectual structure was explored through co-citation analysis and historiographic mapping, highlighting the highest response rates, significant research topics, and historical developments. The social structure analysis mapped the collaboration networks among countries. These four types of analysis were employed to assess the contributions of RTI over the past 27 years. As a result of the scans, the year 1997 was chosen as the starting point because it marks the period when the term RTI and related concepts began to be used more frequently and consistently in academic literature. This period corresponds to the time when foundational studies on the RTI framework were first conducted and when

the concept gained theoretical significance in educational research. Additionally, the late 1990s were characterized by intensified legal regulations and policy discussions in the United States regarding early intervention and special education, which laid the groundwork for the widespread adoption of RTI. Following these developments, amendments to the Individuals with Disabilities Education Act (IDEA) in 2004 emphasized early intervention approaches, further promoting RTI's development and research interest. Considering the results of the analysis, conclusions and recommendations could be made based on the articles published in RTI during this period.

Data Creation Process

This study used Clarivate's Web of Science (WoS) index as the primary data source. Using WoS data, the research literature on RTI was mapped using a bibliometric approach. Mongeon and Paul-Hus (2016) state that WoS and Elseiver's Scopus indexes are frequently used in bibliometric studies. The primary reason for choosing WoS is that it includes only the highest standard journals (Merigó & Yang, 2017), ensuring it effectively identifies the most relevant sources. Additionally, it offers comprehensive coverage of social sciences literature (Norris & Oppenheim, 2007). While obtaining research literature data on RTI from WoS, the steps in Figure 1 were followed. First, relevant keywords given at the first step were used to search the Web of Science (WoS) database. The reason for choosing as broad a set of keywords as possible is to prevent studies on RTI in the literature from being accidentally omitted or not included in this bibliometric study. Then, four related indexes, namely Social Science Citation Index (SSCI), Science Citation Index (SCI), Science Citation Index-Expanded (SSCI-E), and Art & Humanities Citation Index (A&HCI), were selected to refine the search area. The last criteria were selecting only articles and early access articles in English. The first and second researchers read and evaluated all filtered publications, and irrelevant publications were removed. In addition to the two researchers, a panel of experts in the special education field reviewed the publications' abstracts and provided their opinions on their relevance.

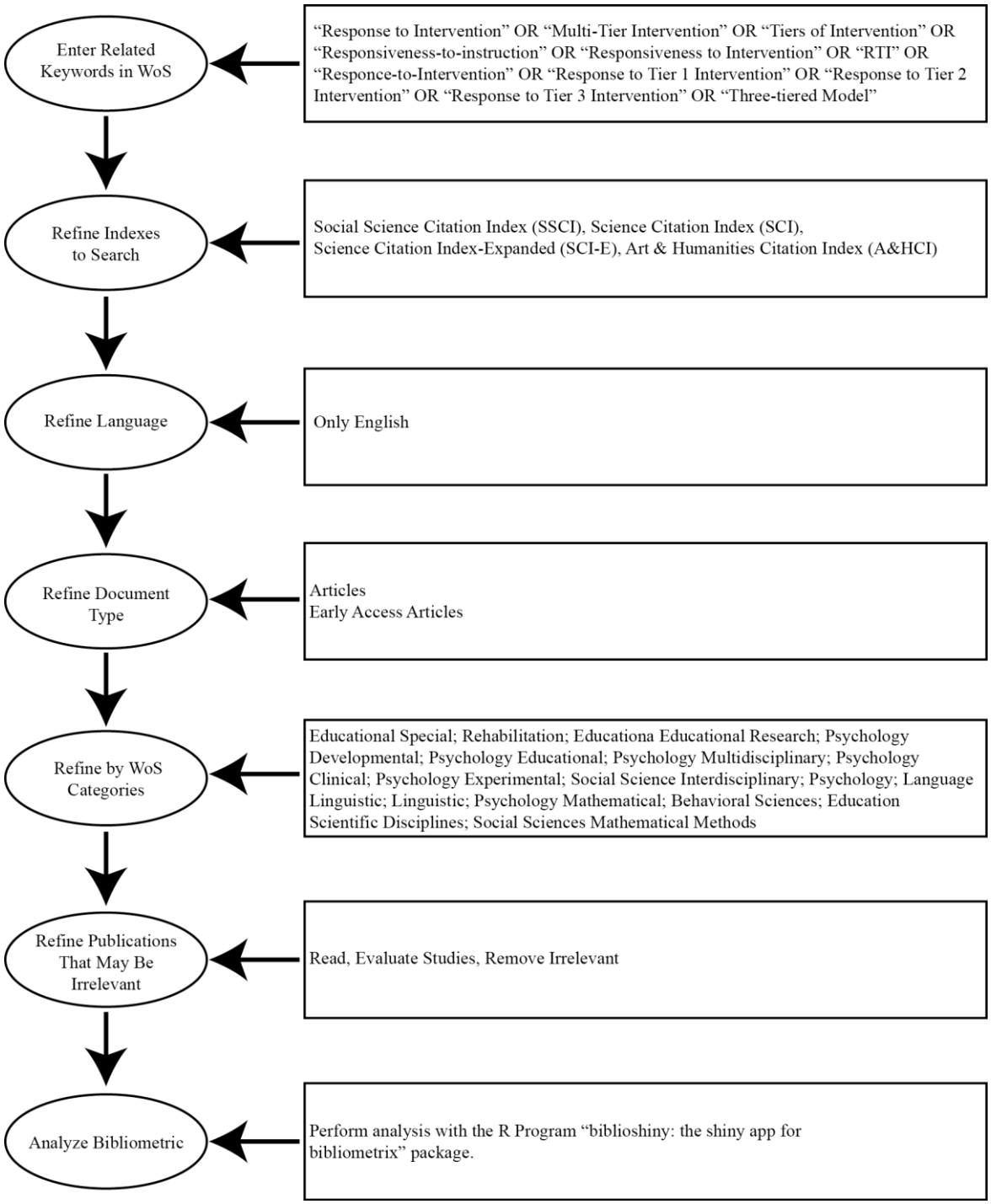

Figure 1. *Data Creation Process*

The data file created by following the stages in Figure 1 included 477 studies on RTI. The refined data file includes metadata about the author, journal, institution/organization, cited sources, the number of citations, country, publication year, and title, abstract, and keywords of the documents.

Data Analysis

In this study, data analysis was carried out using the free software R program. The "biblioshiny: the shiny app for bibliometrix" package of the R program developed by Aria and Cuccurullo (2017) performed the analysis. The analysis revealed the date ranges and numbers of the studies included in the study, the number of authors and international author collaboration status, the annual trend increases of the studies, the average of publications per year, the reference statistics used, and the average amount of citations per research.

The most prevalent and cited sources have been determined by the software. In terms of authors, those researching RTI the most, the highly cited ones, the scholarly publications of these authors by year, the affiliated institutions and organizations, authors working in collaboration, the countries where the authors conduct research, and the most cited work in countries on RTI were examined. In the context of research document (article), the most cited documents at the global and local level, common citation networks, frequently used words in documents, word cloud, keyword frequency and annual trends in documents, trend topics, networks showing closeness and distance in the use of words
were studied.

Results and Discussion

Trends in Annual Publication Data

Examining publication trends and citations on a research topic can guide mapping literature in that discipline. In this study, 477 publications on RTI were identified in the WoS database published between 1997 and 2023. Figure 2 presents the change in the number of publications over the years.

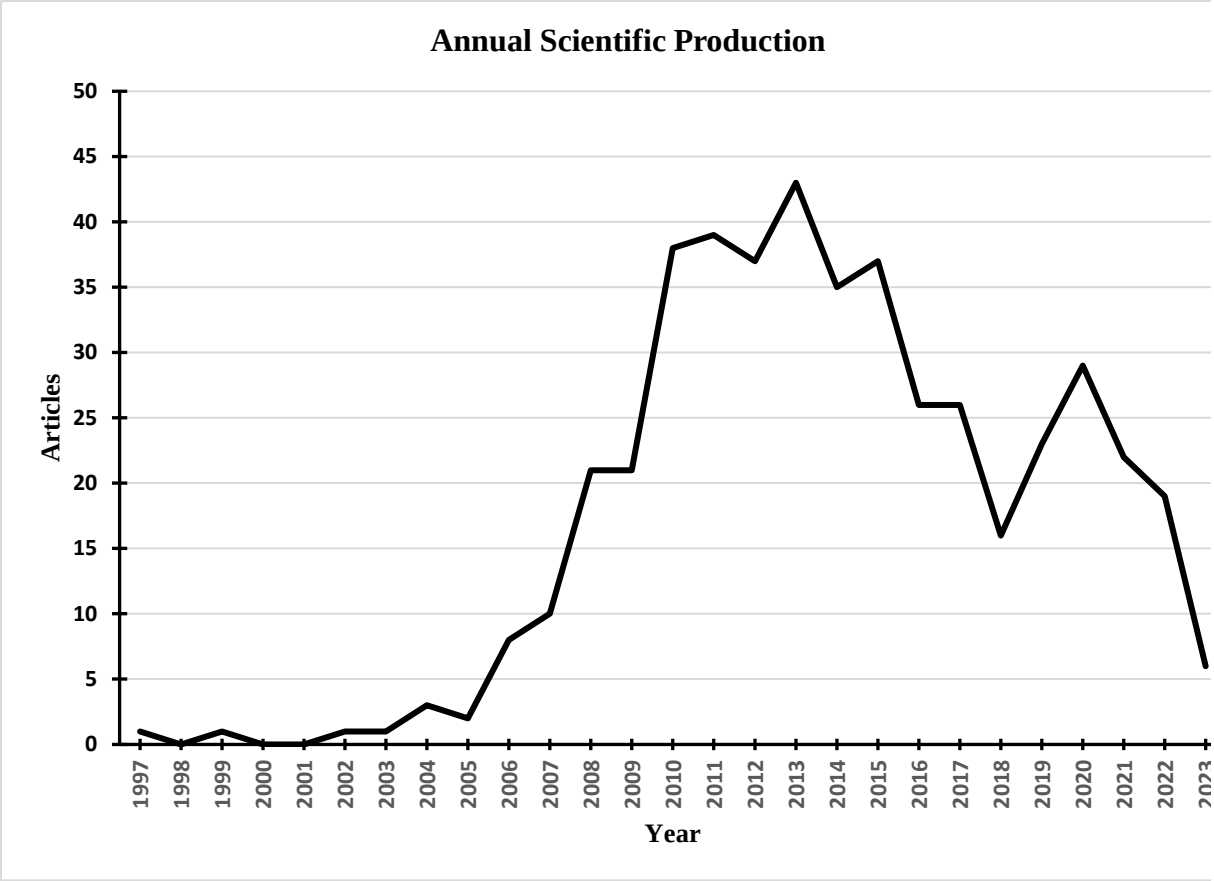

Figure 2. *Trends in Annual Publication Data*

Although small fluctuations were observed in RTI publications between 1997 and 2006, the production trend can be considered stable. Seventeen articles were published between these years. After 2006, there was a steady increase in publications until 2013. In 2013, the increase in publications reached its peak with 43 articles. After 2013, there was a decrease in the publication trend until 2017, and only 16 articles were published in 2018. 23 RTI articles were published in 2019, 29 in 2020, 22 in 2021 and 19 in 2022. Six articles were issued until May 2023, when this study was written for publication. This trend shows that there has been a decrease in the number of articles produced on RTI in recent years.

Core Journals and Publications

Within the scope of the research, 477 articles from 87 journals were accessed in the RTI-related database. Table 1 lists the journals with a high number of articles. Two journals stand out in RTI research: Journal of Learning Disabilities (n = 58) and Learning Disability Quarterly (n = 53). These two journals account for approximately 23% of all publications in the database. However, according to the number of citations, the "Journal of Learning Disabilities" journal ranks first with 1194 citations. It is followed by "Exceptional Children" with 877 citations and "Learning Disability Quarterly" with 439 citations. Therefore, while it appears that a significant portion of the RTI studies are published in journals specialized in learning disabilities, some are published in journals focused on the common field of special education. Only one journal (Journal of Positive Behavior Interventions) is related to behavior management. These journals significantly contribute to the field of special education. The earliest journal, Exceptional Children, has been published in the field since 1934. It can be seen that the first research on RTI started in 1997. Relevant journals will likely continue to create the necessary environment for the dissemination of RTI research.

Table 1. *Core Journals on RTI Research*

Journal	Article	Citations
Journal of Learning Disabilities	58	1194
Learning Disability Quarterly	53	439
Exceptional Children	25	877
Intervention in School and Clinic	24	57
Remedial and Special Education	23	359
Learning Disabilities Research & Practice	18	192
Exceptionality	16	78
Elementary School Journal	14	3
Reading and Writing	14	266
Reading & Writing Quarterly	14	60
Annals of Dyslexia	12	142
Theory into Practice	12	42
Journal of Early Intervention	8	77
Journal of Research on Educational Effectiveness	8	100
Reading Teacher	8	109
Topics in Early Childhood Special Education	8	69
Journal of Positive Behavior Interventions	7	128
The Journal of Special Education	7	1
Psicothema	7	26
Teacher Education and Special Education	7	5

Field-specific journals are important in confirming the dissemination of specialized knowledge, facilitating communication and exchange of ideas between researchers, and contributing to forming scientific communities of experts (Vanderstraeten et al., 2016). Of all the journals in the dataset (n=87), 26.43% specialize in special education, and 73.57% concentrate on general education. Despite this, most publications cluster in journals specialized in special education (Table 1) and suggest providing interaction between researchers in the special education field. However, due to the nature of RTI, applications in general education are expected (Fuchs & Stecker, 2010). Therefore, having more than 25% of the research on RTI in journals specialized in special education and learning disabilities can limit the interaction between academic communities from different disciplines. For instance, as Table 1 shows, 14 studies on RTI in the Elementary School Journal received a low number of citations.

Table 2 presents the most cited, i.e., the most influential articles in RTI research. The publications address a variety of topics, including what RTI is and why it should be used, universal screening tools developed for use in RTI, RTI practices, RTI and professional development, RTI models implemented in the United States, and their characteristics, advantages, and challenges of RTI-based service delivery models, and uncovering fundamental and essential disagreements about the nature and purpose of RTI. In addition, a significant number of publications propose RTI models with various characteristics. These include (a) the RTI approach to behavior support in primary school as an approach to the development and feasibility of RTI, (b) Smart RTI, which is described as an alternative model defined as the efficient use of school resources while maximizing opportunities for student achievement, (c) models of RTI developed in kindergarten through third-grade reading that are expanded to address broader academic content areas and all grade levels, (d) RTI developed in the context of early childhood

inclusion, (e) a possible model of RTI for culturally and linguistically diverse students, and (f) the application of RTI to school-wide positive behavior supports (SWPBS).

Table 2. *Most Influential Articles Ranked by Number of Citations*

Title	Journal	Year	Total Citations
Introduction to response to intervention: What, why, and how valid is it?	Reading Research Quarterly	2006	605
Responsiveness-to-Intervention and School-Wide Positive Behavior Supports: Integration of Multitiered System Approaches	Exceptionality	2009	236
Response to Intervention: Preventing and Remediating Academic Difficulties	Child Development Perspectives	2009	206
Special Education Teacher Quality and Preparation: Exposing Foundations, Constructing a New Model	Exceptional Children	2010	182
The "Blurring" of Special Education in a New Continuum of General Education Placements and Services	Exceptional Children	2010	180
Smart RTI: A Next-Generation Approach to Multilevel Prevention	Exceptional Children	2012	173
Implementation of Response to Intervention	Journal of Learning Disabilities	2009	173
Response to Intervention as a Vehicle for Distinguishing Between Children with and Without Reading Disabilities: Evidence for the Role of Kindergarten and First-Grade Interventions	Journal of Learning Disabilities	2006	171
Inclusion for Young Children with Disabilities: A Quarter Century of Research Perspectives	Journal of Early Intervention	2011	161
Cultural considerations with Response to Intervention models	Reading Research Quarterly	2006	150
Response to Intervention: Examining Classroom Behavior Support in Second Grade	Exceptional Children	2007	149
Responsiveness-to-Intervention: A Decade Later	Journal of Learning Disabilities	2012	139
Diagnosis and Treatment of Reading Disabilities Based on the Component Model of Reading an Alternative to the Discrepancy Model of LD	Journal of Learning Disabilities	2008	138
Alternative Approaches to the Definition and Identification of Learning Disabilities: Some Questions and Answers	Annals of Dyslexia	2004	132
Floor Effects Associated with Universal Screening and Their Impact on the Early Identification of Reading Disabilities	Journal of Learning Disabilities	2009	128
The PDD Behavior Inventory: A Rating Scale for Assessing Response to Intervention in Children with Pervasive Developmental Disorder	Journal of Autism and Developmental Disorders	2003	123
Language-Minority Learners in Special Education Rates and Predictors of Identification for Services	Journal of Learning Disabilities	2009	113
Response to Intervention: Empirically Based Special Service Decisions from Single-Case Designs of Increasing and Decreasing Intensity	The Journal of Special Education	2004	106
Critical Issues in Response-To-Intervention, Comprehensive Evaluation, and Specific Learning Disabilities Identification and Intervention: An Expert White Paper Consensus	Learning Disability Quarterly	2010	105

Collectively, it is possible to say that the content of these studies mainly focuses on the features of RTI, its implementation, the challenges encountered in its implementation, and developing suggestions for different application areas. Regarding RTI, almost all essential publications began appearing in the early 2000s. The exponential growth in research in the field began in this period. These publications reinforce the foundations of research in the field of RTI and constitute a turning point in the development of the field.

Top Authors, Institutions, and Countries

The 477 articles in the dataset were published by 1,215 authors affiliated with 388 institutions in 28 countries worldwide. Table 3 shows authors with ten or more publications who pioneered RTI research. LS Fuchs and S Vaughn appear to be the most prolific authors with the most publications, followed closely by D Fuchs and DL Compton. Regarding the number of citations, unlike the number of publications, DL Compton ranks first, followed by LS Fuchs and D Fuchs. Strikingly, while approximately 82% of authors in our dataset produced one publication, only 0.8% produced more than ten publications. This finding shows that expertise in the field of RTI is concentrated around a minimal number of academics.

Table 3. *Top Authors Ranked by Number of Publications*

Author	Institution	Country	Article	Citations
Fuchs, LS	Vanderbilt University	United States	21	31
Vaughn, S	University of Texas	United States	21	19
Fuchs, D	Vanderbilt University	United States	18	31
Compton, DL	Florida State University	United States	16	34
Coyne, MD	University of Connecticut	United States	12	1
Fletcher, JM	University of Houston	United States	12	20
Al Otaiba, S	Southern Methodist University	United States	10	8
Greenwood, CR	University of Kansas	United States	10	15
Schatschneider, C	Florida State University	United States	10	6
Smolkowski, K	Oregon Research Institute	United States	10	7

Note. Only authors with 10 or more publications were included in the table.

Uncovering where researchers publishing on RTI are located provides another insight into the current state of research on RTI. Table 4 shows the institutions leading the RTI research. It lists only the institutions with 15 or more publications; Florida State University has the most publications in its field, followed by Vanderbilt University and the University of Texas Austin. Almost all the institutions in the ranking are from the United States, and only Spain represents Europe. The fact that most publications are from the United States raises questions about the generalizability of RTI in terms of legal regulations, diagnostics, and implementation processes across different cultures. Therefore, RTI publications by researchers from different countries will contribute to the cultural diversity in the literature and increase the potential of its dissemination and use worldwide.

Table 4. *Top Institutions Ranked by Number of Publications*

Institution	Country	Article
Florida State University	United States	75
Vanderbilt University	United States	68
University of Texas Austin	United States	64
University of Kansas	United States	59
University of Oregon	United States	48
University of Connecticut	United States	36
University of Minnesota	United States	34
University of Houston	United States	32
University of Missouri	United States	25
Texas A&M University	United States	24
University of California, Riverside	United States	24
University of North Carolina at Chapel Hill	United States	23
Lehigh University	United States	19
Southern Methodist University	United States	19
University of La Laguna	Spain	18
University of Washington	United States	18
Arizona State University	United States	17

Institution	Country	Article
University of Georgia	United States	17
University of Florida	United States	15

Note. Only institutions with 15 or more publications were included in the list.

Figure 3 presents the countries issuing RTI research, sorted by the number of publications. Of the 477 publications examined in the database, 395 were published in the United States. Publications from the United States appear to be the leader in this field, accounting for 82.8% of the total publications in the database. Moreover, it is noteworthy that 385 of 395 publications from the United States are single-country publications, and only 10 publications are multiple-country publications. Similarly, Figure 3 and Figure 4 demonstrate that only the United States has a high contribution to the dataset, with over 100 publications and over 10,000 citations. There are many reasons for this: (a) Educational Policies and Legislation: The U.S. has solid educational policies and legislation that support and promote RTI. The reauthorization of the Individuals with Disabilities Education Act (IDEA) in 2004 introduced RTI as a model to be used in special education (Wright & Wright, 2007); (b) Research and Development: The U.S. hosts numerous research and development activities that emphasize the importance of evidence-based practices in education. Consequently, there is a robust research infrastructure for developing and implementing innovative approaches like RTI (Fuchs & Fuchs, 2006); (c) Universities and educational organizations are providing training programs that equip teachers and other education professionals with the knowledge and skills necessary to effectively implement RTI practices in their schools and classrooms (Basham et al., 2010; Murakami-Ramalho & Wilcox, 2012).; (d) Financial Support: U.S. schools and districts have access to federal and state funding to support RTI implementation. This financial support facilitates the practical application of RTI models (Jimerson et al., 2007).

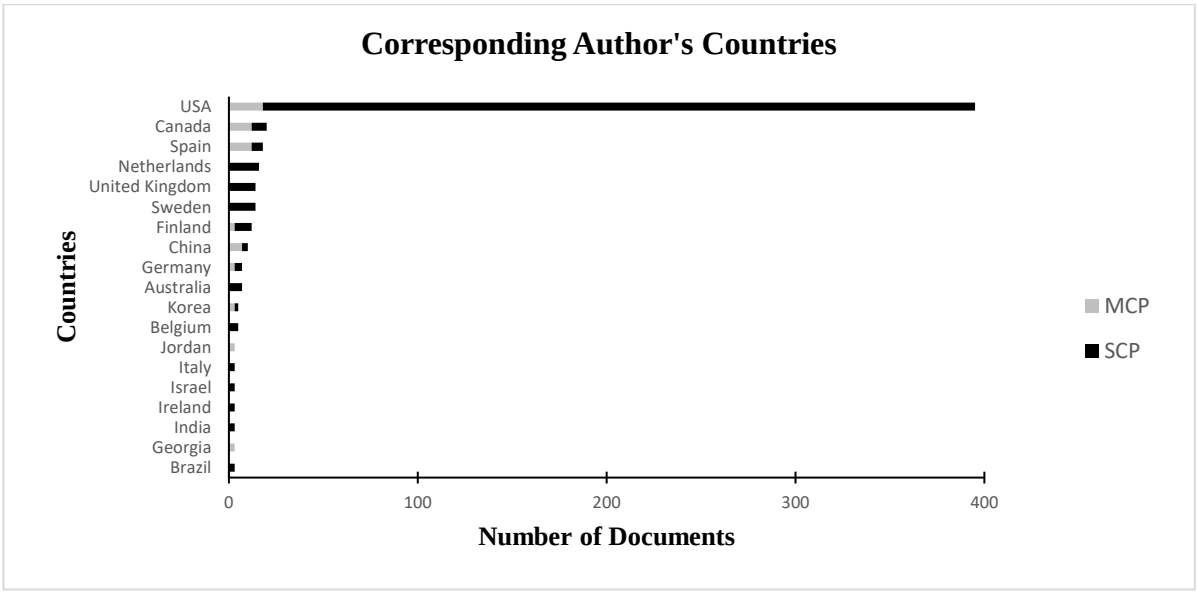

Figure 3. *Corresponding Author's Countries*

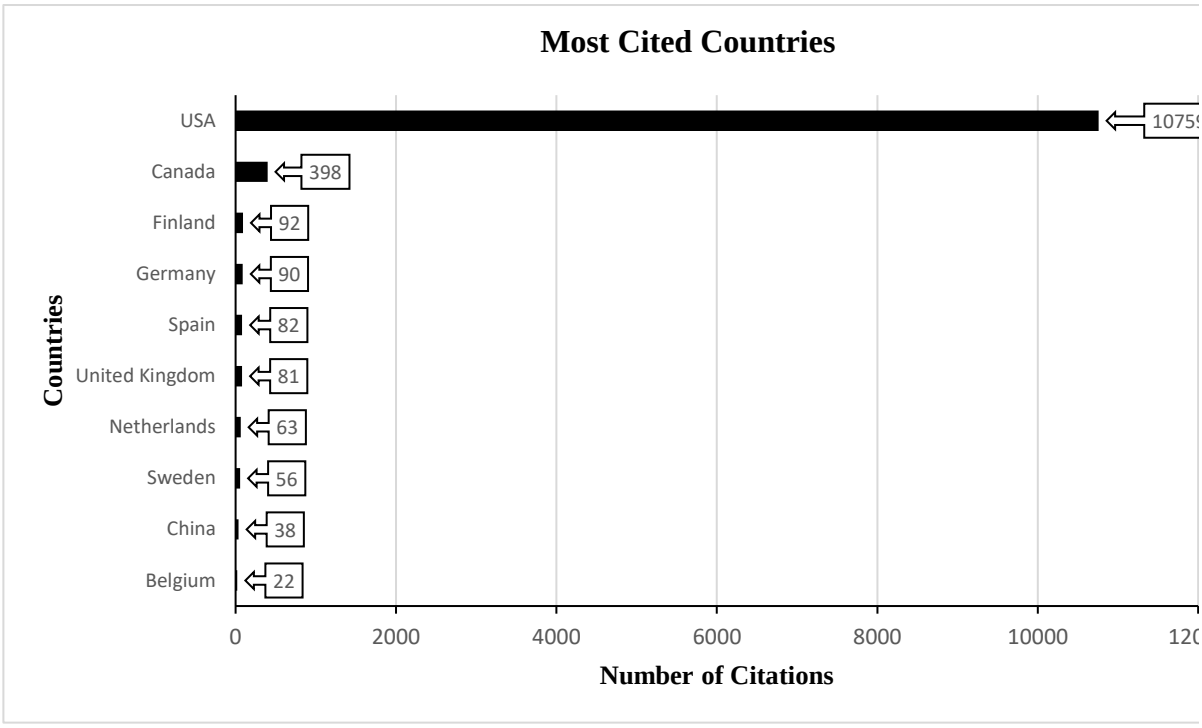

Figure 4. *Most Cited Countries*

Collaborative Networks between Authors, Institutions and Countries/Regions

Several co-authorship analyses have been conducted to examine patterns in scientific collaboration between authors, institutions, and countries in the RTI research. Figure 5 exhibits the collaborative networks among authors who have published on RTI in the dataset. The results show various scientific collaboration networks (i.e., clusters) among researchers. These networks consist of three to nine researchers and often include a lead researcher (i.e., the largest node) as the connecting node among all other researchers. The cluster containing LS Fuchs, D Fuchs, and D Compton and the one that contains S Vaughn are centrally located in the figure. However, both are only well connected to two clusters with relatively lesser density on the map but not to the remaining five. The two clusters in the center show that research collaborations in the field of RTI exist but need to be developed.

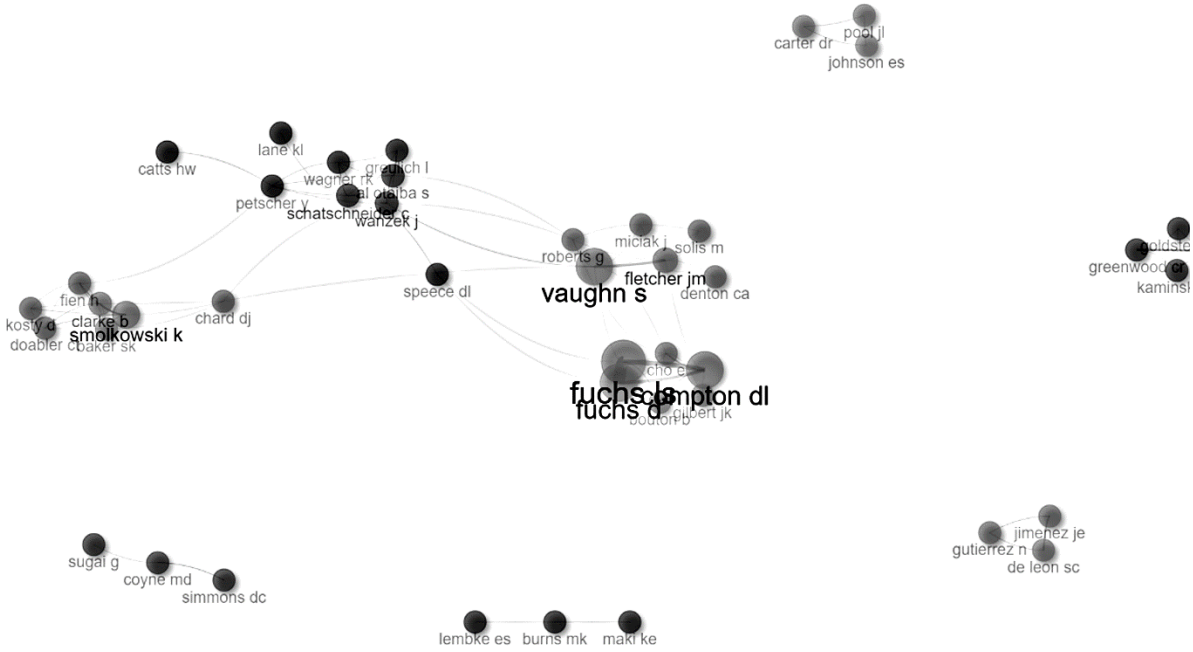

Figure 5. *Collaborative Research Networks between Authors*

Figure 6 shows scientific networks among institutions that publish on RTI. As seen on the map, most of the clusters in the graph show that institutions in the USA cooperate. As well as Florida State University and the University of Texas Austin, Vanderbilt University, the University of Kansas, and the University of Oregon are the leaders in this cooperation.

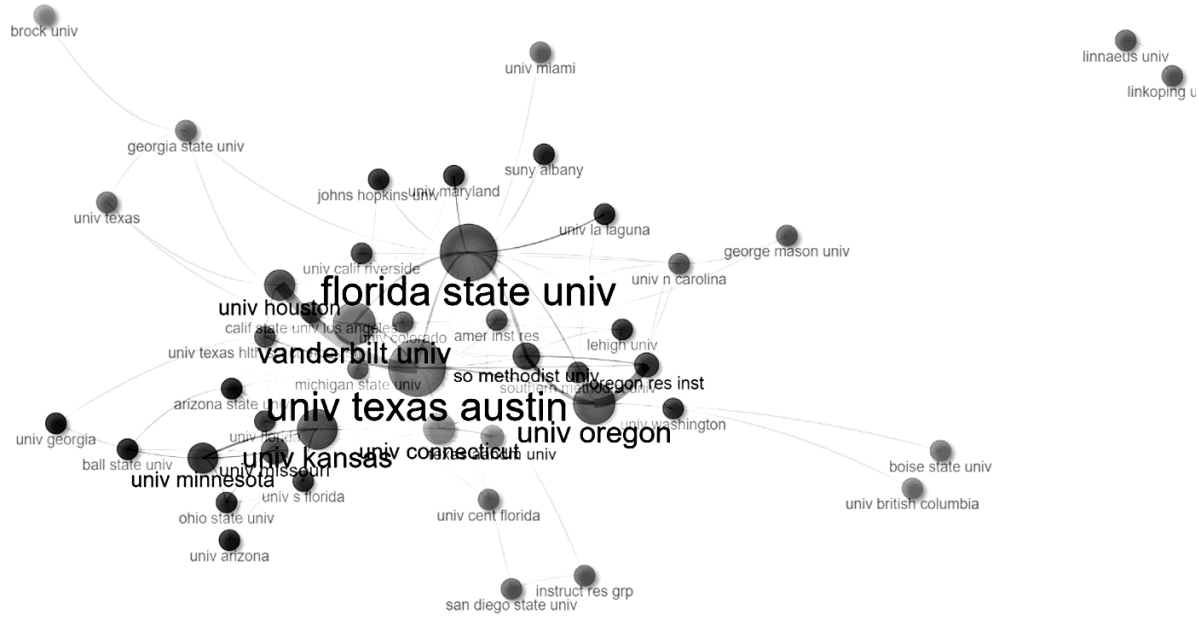

Figure 6. *Collaborative Research Networks between Institutions*

Figure 7 shows the research collaborations between countries with publications on RTI in the dataset. According to the results, the United States stands at the center of RTI research. The map illustrates the strong ties of the United States with Canada and Spain and weaker ties with Europe, Asian countries, and Australia. Two northern European countries, Luxembourg and Switzerland, have no connections to clusters.

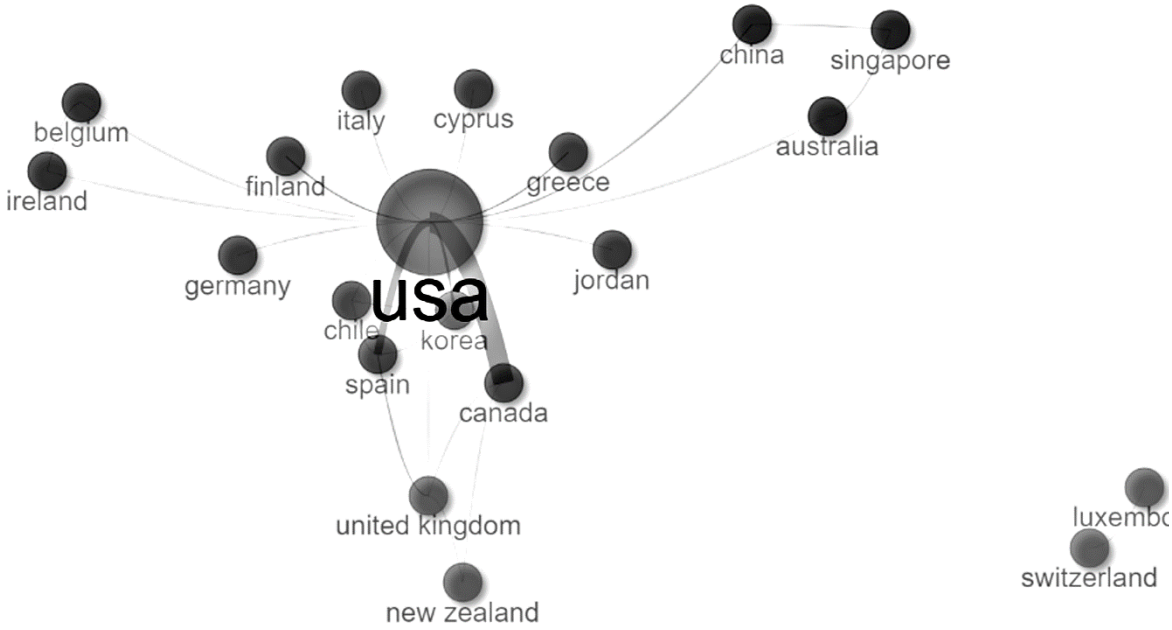

Figure 7. *Collaborative Research Networks between Countries*

As a result, the United States leads the scientific collaboration networks among authors, institutions, and countries in RTI research. This strong collaboration network in the USA should be developed in other countries to maintain and spread the RTI approach.

Trends of Words Used in Response to Intervention (RTI) Articles and Research

The frequency of words used in RTI research was examined from the bibliographic data of RTI research obtained from WoS. According to the results, RTI was mostly identified with the words children, students, instruction, intervention, disabilities, risk, identification, model, kindergarten, learning disabilities, special education, difficulties, and responsiveness. The popularity or trend of this word network over time was also examined, as displayed in Figure 8.

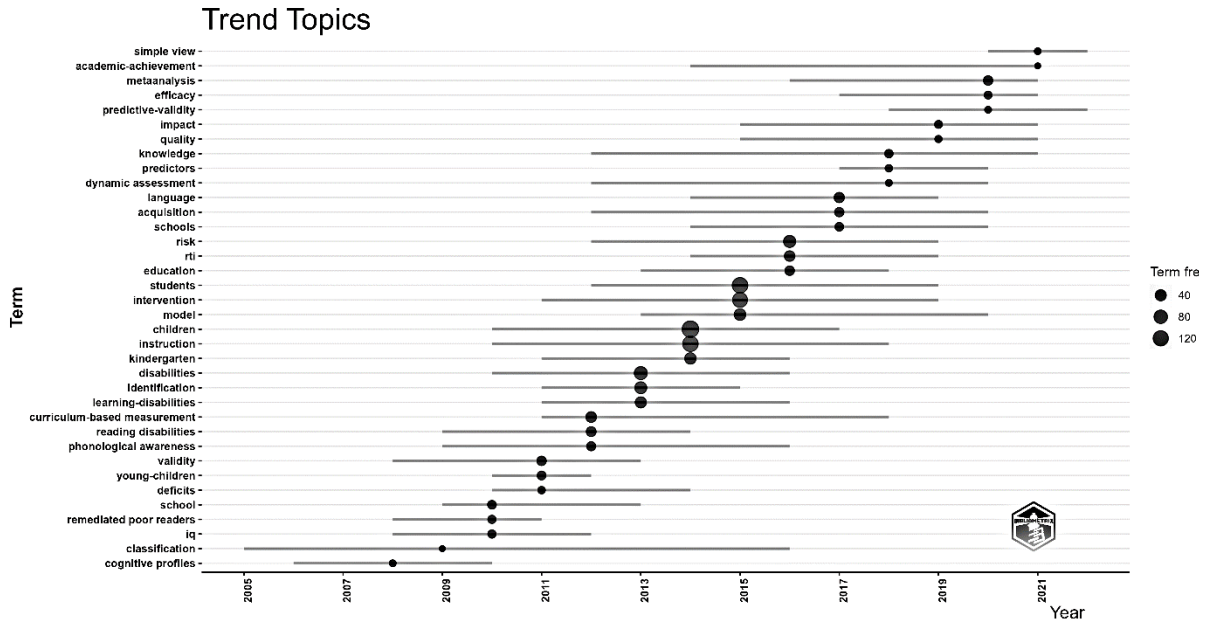

Figure 8. *The Trend of Keywords in RTI Publications over Time*

In the publications between 2005 and 2010, the words classification, cognitive profiles, IQ, remediated poor readers, validity, school, reading disabilities, phonological awareness, young children, deficits, disabilities, children, and instruction were frequently used.

The words curriculum-based measurement, identification, learning disabilities, kindergarten, intervention, students, risk, acquisition, knowledge, dynamic assessment, model, education, RTI, language, schools, academic achievement, impact, and quality were commonly used in publications between 2011 and 2015. Finally, in publications between 2016 and 2023, words like meta-analysis, predictors, efficacy, predictive validity, and simple view were the most common. Figure 9 illustrates the use of words in a network and word affinities.

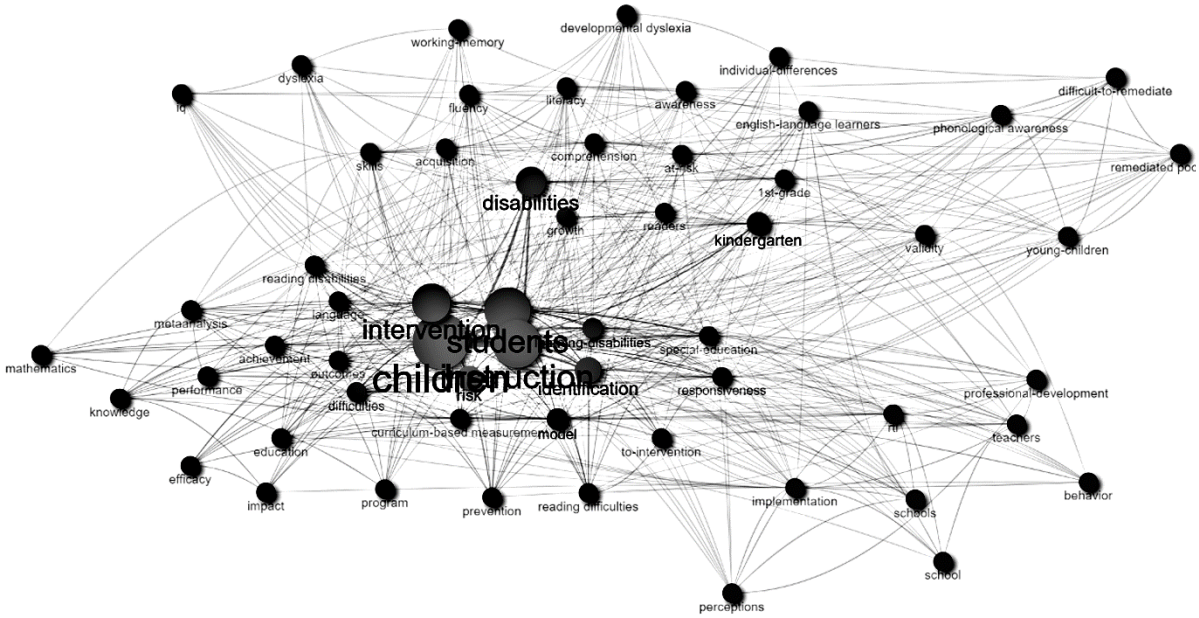

Figure 9. *Network of Word Usage in RTI Publications*

Figure 9 shows that the word network forms four groups. While two groups stayed more denser, two remained on the outer periphery. The first group with a dense network includes the words children, students, instruction, intervention, identification, language, reading, disabilities, model, achievement, learning disabilities, difficulties, special education, mathematics, knowledge, performance, efficacy, curriculum-based-measurement, program, impact, prevention, reading difficulties. The second group on RTI includes the words disabilities, kindergarten, IQ, dyslexia, working memory, developmental dyslexia, individual differences, awareness, at risk, readers, comprehension, literacy, fluency, acquisition, skills, and growth. In the third and outer peripheral group, words are professional development, RTI, teachers, behavior, schools, perceptions, and implementation. The fourth and outer peripheral group includes the words difficult-to-remediate, phonological awareness, remediated poor readers, and young children.

Discussion

This study provides an overview of the development and status of research on response to intervention over the last 27 years, based on data available in the WoS database. The results show that as a developing field of study, RTI research increased exponentially until 2013, but the number of studies has drastically decreased. The decline in the RTI investigation numbers may have resulted from a combination of factors. One of these may be ensuring data maturity regarding RTI. RTI was introduced in the early 2000s and was rapidly adopted. It has become a hot topic, especially among researchers interested in student learning and interventions. With the publication of the "Individuals with Disabilities Education Act" (IDEA) (2004) in the United States in 2004, RTI practices increased throughout the country since the IDEA regulation that is accepted to include the RTI approach recommends a systematic monitoring, intervention, and screening process to determine a child's response to scientifically based intervention (Fuchs et al., 2010; Stuart et al., 2011). RTI practices received great interest and popularity during this period; therefore, more research was conducted. However, over time, significant information has accumulated about the effects and feasibility of RTI, and thus, the need for new research may have diminished. In addition to RTI, other educational approaches and intervention models have been developed in the field of education. By focusing on these developed approaches and models, researchers may have begun to examine different topics from RTI research. Another factor may be that educational priorities and urgent needs have changed over time, especially in recent years; the prevalence of issues such as distance education has come to the fore in the education field, which may have caused a decrease in RTI research. Since RTI research covers practices in schools, online learning during the pandemic made the applied research difficult. This fact may be another reason for the decline in RTI research in recent years. Despite the changes in priorities and needs over time, RTI or similar approaches may again receive greater research interest in the future.

In the studies published in the database between 2005 and 2010, the terms "classification, cognitive profiles, IQ, remediated poor readers, validity, school, reading disabilities, phonological awareness, young children, deficits

disabilities, children, instruction" were frequently used. Students' reading difficulties, cognitive profiles, and issues such as the classification and validity of reading difficulties have gained importance during this period. In the years 2011-2015, "curriculum-based measurement, identification, learning disabilities, kindergarten, intervention, students, risk, acquisition, knowledge, dynamic assessment, model, education, RTI, language, schools, academic achievement, impact, and quality" were emphasized. During this period, among the common topics were diagnosing learning disabilities, curriculum-based measurement, and response approaches. During the years 2016-2023, terms such as "meta-analysis, predictors, efficacy, predictive validity and simple view" became more prominent. In this period, more emphasis was given to meta-analysis studies summarizing research results and predicting student success. The changing emphasis of these terms may reflect how educational priorities and research methods have transformed over time. Such analysis can help us better understand educational research's evolving trends and focuses.

Finally, RTI research confirms that the United States leads the scientific collaboration networks between authors, institutions, and countries, with well-established collaboration networks mostly strong among authors and institutions within the United States. The contribution of researchers in other countries to scientific literature is limited. Educational intervention models such as RTI enable opportunities for collaboration internationally. Such collaboration can promote international sharing and development of educational practices and effective methods. Countries, researchers, and educators can share best practices on effective education intervention models such as RTI. In addition, international collaboration can provide opportunities to collect and review data internationally to evaluate and improve the efficiency of RTI practices. Comparative analysis of RTI programs in different countries can offer broader perspectives with its adaptable feature across different cultures. Hence, international collaboration can provide knowledge and perspective on how best to adapt the RTI model in different cultures.

Limitations and Recommendations

Although bibliometric analysis is a powerful tool for reviewing and analyzing scientific literature, such studies have some limitations in their bibliographic data. Additionally, the data source may only cover some scientific literature, which may restrain the scope of the analysis. Only the research findings in the WoS database were considered in this study. A comprehensive picture of the RTI literature was created with an investigation limited to the WoS collection, which constitutes a limitation of the research. It does not entail literature accessed through Scopus, ERIC, PsyInfo, PubMed, or other publications such as books, book chapters, or conferences. Future studies should examine literature using alternative databases (e.g., Scopus, ERIC, PsyInfo, PubMed) and additional publication types other than articles.

Another limitation of the study is the keywords selected for the search. The term multi-tiered systems of support (MTSS), which also encompasses RTI implementations, was not included among the keywords. Multi-Tiered Systems of Support (MTSS) and Response to Intervention (RTI) are both frameworks used in education to provide targeted support to students. While they share similarities, there are distinct differences between the two. MTSS adopts a holistic child approach addressing multiple aspects of a student's development, while RTI specifically aims to identify and support students with learning and behavior difficulties. Therefore, our recommendation for a future bibliometric study is to examine studies that include academic, behavioral, and social-emotional supports within the scope of the MTSS approach.

As in all bibliometric studies, the quality or content of the studies examined in this study was not evaluated; only quantitative results based on a specific metric or indicator were presented. Despite these limitations, this study is believed to provide a comprehensive review of the literature on RTI and provides helpful insights into the development of the field for future research.

Ethical Approval

We, the authors, declare that the study named "**Response to Intervention: A Bibliometric Mapping**" does not require an Ethics Committee Approval since it typically involves the analysis of publicly available data, such as research publications, citations, and bibliographic information

References

Abbott, M., & Wills, H P. (2012). Improving the upside-down response-to-intervention triangle with a systematic, effective elementary school reading team. *Taylor & Francis, 56*(1), 37-46. https://doi.org/10.1080/1045988x.2011.555793

Alahmari, A. (2019). A Review and synthesis of the Response to Intervention (RtI) literature: teachers' implementations and perceptions. *International Journal of Special Education, 33*(4), 894-909. https://doi.org/10.7176/JEP/10-15-02

Allsopp, D. H., McHatton, P. A., & Farmer, J. L. (2010). Technology, mathematics PS/RTI, and students with LD: What do we know, what have we tried, and what can we do to improve outcomes now and in the future?. *Learning Disability Quarterly, 33*(4), 273-288. https://doi.org/10.1177/0731948710033004

Andrés, A. (2009). *Measuring academic research, how to undertake a bibliometric study.* Oxford: Chandos Publishing (CP).

Aria, M., & Cuccurullo, C. (2017). Bibliometrix: An R-tool for comprehensive science mapping analysis. *Journal of Informetrics, 11*(4), 959-975. https://doi.org/10.1016/j.joi.2017.08.007

Batsche, G. M., Elliott, J., Graden, J. L., Grimes, J., Kovaleski, J. F., Prasse, D., ... & Tilly, W. D. (2005). *Response to intervention: Policy considerations and implementation.* VA: National Association of State Directors of Special Education.

Berkeley, S., Bender, W. N., Gregg, L. P., & Saunders, L. (2009). Implementation of response to intervention: A snapshot of progress. *Journal of Learning Disabilities, 42*(1), 85–95. https://doi.org/10.1177/0022219408326214

Björn, P. M., Aro, M. T., Koponen, T. K., Fuchs, L. S., & Fuchs, D. H. (2018). Response-to-intervention in Finland and the United States: Mathematics learning support as an example. *Frontiers in Psychology, 9,* 1–10. https://doi.org/10.3389/fpsyg.2018.00800

Burns, M. K., Appleton, J. J., & Stehouwer, J. D. (2005). Meta-analytic review of responsiveness-to-intervention research: Examining field-based and research-implemented models. *Journal of Psychoeducational Assessment, 23(*4), 381-394. https://doi.org/10.1177/073428290502300406

Compton, D. L., Fuchs, D., Fuchs, L. S., & Bryant, J. D. (2006). Selecting at-risk readers in first grade for early intervention: A two-year longitudinal study of decision rules and procedures. *Journal of Educational Psychology, 98*(2), 394–409. https://doi.org/10.1037/0022-0663.98.2.394

Deno, S. L. (2003). Developments in curriculum-based measurement. *The Journal of Special Education, 37*(3), *184-192.* https://doi.org/10.1177/00224669030370030801

Ehren, B. J., & Nelson, N. W. (2005). The responsiveness to intervention approach and language impairment. *Topics in Language Disorders*, *25*(2), 120-131. https://doi.org/10.1097/00011363-200504000-00005

Fletcher, J. M., Lyon, G. R., Fuchs, L. S., & Barnes, M. A. (2007). *Learning disabilities: From identification to intervention*. Guilford Press.

Fletcher, J M., & Vaughn, S. (2009, March 23). Response to intervention: Preventing and remediating academic difficulties. *Wiley-Blackwell, 3*(1), 30-37. https://doi.org/10.1111/j.1750-8606.2008.00072.x

Fuchs, L. S., & Fuchs, D. (1998). Treatment validity: A unifying concept for reconceptualizing the identification of learning disabilities. *Learning Disabilities Research and Practice, 13*, 204–219.

Fuchs, D., & Fuchs, L. S. (2006). Introduction to response to intervention: What, why, and how valid is it? *Reading Research Quarterly, 41*(1), 93-99. https://doi.org/10.1598/RRQ.41.1.4

Fuchs, L. S., & Fuchs, D. (2005). Using curriculum-based measurement to improve student achievement: Review of research. *Psychology in the Schools, 42*(8), 795-819. https://doi.org/10.1002/pits.20113

Fuchs, D., Fuchs, L. S., & Stecker, P. M. (2010). The "blurring" of special education in a new continuum of general education placements and services. Exceptional Children, *76*(3), 301-323. https://doi.org/10.1177/001440291007600304

Fuchs, D., Mock, D., Morgan, P. L., & Young, C. L. (2003). Responsiveness-to-intervention: Definitions, evidence, and implications for the learning disabilities construct. *Learning Disabilities Research and Practice, 18*(3), 151–171. https://doi.org/10.1111/1540-5826.00072

Gischlar, K. L., Keller-Margulis, M., & Faith, E. L. (2019). Ten years of response to intervention: Trends in the school psychology literature. *Contemporary School Psychology, 23*(3), 201-210. https://doi.org/10.1007/s40688-018-0179-9

Gresham, F. M. (2002). Responsiveness to intervention: An alternative approach to the identification of learning disabilities. In R. Bradley, L. Danielson, & D. P. Hallahan (Eds.), *Identification of learning disabilities: Response to treatment* (pp. 467-519). NJ: Erlbaum.

Grether, S. M., & Sickman, L. S. (2008). AAC and RTI: Building classroom-based strategies for every child in the classroom. *Seminars in Speech and Language*, *29*(2), 155–163. https://doi.org/10.1055/s-2008-1079129

Hughes, C., & Dexter, D. D. (2011). Response to intervention: A research-based summary. *Taylor & Francis, 50*(1), 4-11. https://doi.org/10.1080/00405841.2011.534909

Jimerson, S. R., Burns, M. K., & VanDerHeyden, A. M. (2007). *Handbook of response to intervention*. NY: Springer.

Leung, E. (2021). Examining learning disabilities in schools through an intersectional and equitable lens. Learning disabilities-neurobiology, assessment, clinical features and treatments. IntechOpen. https://doi.org/10.5772/intechopen.99572

Lonigan, C. J., & Phillips, B. M. (2016). Response to instruction in preschool: Results of two randomized studies with children at significant risk of reading difficulties. *Journal of Educational Psychology, 108*(1), 114-129. https://doi.org/10.1037/edu0000054

Marston, D. (2005). Tiers of intervention in responsiveness to intervention: Prevention outcomes and learning disabilities identification patterns. *Journal of Learning Disabilities, 38*(6), 539-544. https://doi.org/10.1177/00222194050380061001

Merigó, J. M., & Yang, J. B. (2017). Accounting research: A bibliometric analysis. *Australian Accounting Review*, *27*(1), 71-100. https://doi.org/10.1111/auar.12109

Mongeon, P., & Paul-Hus, A. (2016). The journal coverage of Web of Science and Scopus: A comparative analysis. *Scientometrics, 106*(1), 213-228. https://doi.org/10.1007/s11192-015-1765-5

Murakami-Ramalho, E., & Wilcox, K. A. (2012). Response to intervention implementation: A successful principal's approach. *Journal of Educational Administration*, *50*(4), 483-500https://doi.org/10.1108/09578231211238602

Norris, M., & Oppenheim, C. (2007). Comparing alternatives to the Web of Science for coverage of the social sciences' literature. *Journal of Informetrics*, *1*(2), 161-169. https://doi.org/10.1016/j.joi.2006.12.001

Pretti-Frontczak, K., Carta, J., Dropkin, E., Fox, L., Grisham-Brown, J., Edwards, C., & Sandall, S. (2014). Frameworks for response to intervention in early childhood: Description and implications. *Communication Disorders Quarterly*, *35*, 108-119. https://doi.org/10.1177/1525740113514111

Prieto-Jiménez, E., López-Catalán, L., López-Catalán, B., & Domínguez-Fernández, G. (2021). Sustainable development goals and education: A bibliometric mapping analysis. *Sustainability*, *13*(4), 2126. https://doi.org/10.3390/su13042126

Reynolds, C. R., & Shaywitz, S. E. (2009). Response to Intervention: Ready or not? Or, from wait-to-fail to watch-them-fail. *School Psychology Quarterly*, *24*(2), 130–145. https://doi.org/10.1037/a0016158

Roemer, R. C., & Borchardt, R. (2015). *Meaningful metrics: A 21st century librarian's guide to bibliometrics, altmetrics, and research impact.* IL: Association of College and Research Libraries.

Scanlon, D. M., Gelzheiser, L. M., Vellutino, F. R., Schatschneider, C., & Sweeney, J. M. (2008). Reducing the incidence of early reading difficulties: Professional development for classroom teachers versus direct interventions for children. *Learning and Individual Differences*, *18*(3), 346-359. https://doi.org/10.1016/j.lindif.2008.05.002

Shinn, M. (2008). Best practices in using curriculum-based measurement in a problem-solving model. In A. Thomas & J. Grimes (Eds.), *Best practices in school psychology V* (pp. 243-262). MD: National Association of School Psychologists.

Speece, D. L., & Case, L. P. (2001). Classification in context: An alternative approach to identifying early reading disabilities. *Journal of Educational Psychology, 93*(4), 735–749. https://doi.org/10.1037/0022-0663.93.4.735

Stecker, P. M., Fuchs, L. S., & Fuchs, D. (2005). Using curriculum-based measurement to improve student achievement: Review of research. *Psychology in the Schools, 42,* 795–819. https://doi.org/10.1002/pits.20113

Stuart, S., Rinaldi, C., & Higgins-Averill, O. (2011). Agents of change: Voices of teachers on response to intervention. *International Journal of Whole Schooling, 7*(2), 53-73. https://files.eric.ed.gov/fulltext/EJ939060.pdf

Swanson, E., Stevens, E. A., Scammacca, N. K., Capin, P., Stewart, A. A., & Austin, C. R. (2017). The impact of tier 1 reading instruction on reading outcomes for students in grades 4–12: A meta-analysis. *Reading and Writing, 30,* 1639-1665. https://doi.org/10.1007/s11145-017-9743-3

Torgesen, J. K., Wagner, R. K., Rashotte, C. A., Rose, E., Lindamood, P., & Conway, T. (1999). Preventing reading failure in young children with phonological processing disabilities: Group and individual responses to instruction. *Journal of Educational Psychology, 91*(4), 579–593. https://doi.org/10.1037/0022-0663.91.4.579

Tran, L., Sanchez, T., Arellano, B., & Lee Swanson, H. (2011). A meta-analysis of the RTI literature for children at risk for reading disabilities. *Journal of Learning Disabilities, 44*(3), 283-295. https://doi.org/10.1177/0022219410378447

Vanderstraeten, R., Vandermoere, F., & Hermans, M. (2016). Scholarly communication in AERA journals, 1931 to 2014. *Review of Research in Education, 40*(1), 38–61. https://doi.org/10.3102/0091732X16678836.

Vaughn, S., & Fuchs, L. S. (2003). Redefining learning disabilities as inadequate response to instruction: The promise and potential problems. *Learning Disabilities Research & Practice, 18*(3), 137-146. https://doi.org/10.1111/1540-5826.00070

Vaughn, S., Linan-Thompson, S., & Hickman, P. (2003). Response to instruction as a means of identifying students with reading/learning disabilities. *Exceptional Children, 69*(4), 391–409. https://doi.org/10.1177/001440290306900401

Vaughn, S., & Fletcher, J. M. (2012). Response to intervention with secondary school students with reading difficulties. *Journal of Learning Disabilities, 45*(3), 244-256. https://doi.org/10.1177/0022219412442157

Wanzek, J., & Vaughn, S. (2011). Is a three-tier reading intervention model associated with reduced placement in special education? *Remedial and Special Education, 32*(2), 167–175. https://doi.org/10.1177/0741932510361267

Wright, P. W., & Wright, P. D. (2007). *Special education law*. VA: Harbor House Law.

Zupic, I., & Čater, T. (2015). Bibliometric methods in management and organization. *Organizational Research Methods, 18*(3), 429-472. https://doi.org/10.1177/1094428114562629