Psychology in the Schools

WILEY

RESEARCH ARTICLE OPEN ACCESS

Trends and Topics Evolution in Research on Giftedness in Education: A Bibliometric Analysis

Rius Cristina[1,2,3,4] | Aguilar-Moya Remedios[5] | Martínez-Córdoba Celia[2] | Cantos-Roldan Begoña[2] | Vidal-Infer Antonio[1,2]

[1]Department of History of Science and Information Science. School of Medicine and Dentistry, University of Valencia, Valencia, Spain | [2]UISYS Group, Unit associated with the Interuniversity Institute for Advanced Research on the Evaluation of Science and the University (INAECU) UC3M-UAM, Madrid, Spain | [3]Spanish National Centre for Cardiovascular Research (CNIC), Madrid, Spain | [4]CIBERCV, Madrid, Spain | [5]Interdisciplinary Group on Active Learning and Assessment (IGALA). Faculty of Training and Education Sciences, Catholic University of Valencia, Valencia, Spain

Correspondence: Vidal-Infer Antonio (vinan@uv.es)

Received: 25 November 2024 | **Revised:** 31 March 2025 | **Accepted:** 9 April 2025

Funding: The authors received no specific funding for this work.

Keywords: educational environment | gifted education | giftedness research | high skills | psychometry | talented educating

ABSTRACT

The article explores the evolution of research on giftedness and high ability through a bibliometric analysis. It highlights challenges in identifying gifted individuals, who represent approximately 6.5% of students, although biased instruments and discriminatory selection practices may affect the identification of high skilled students. The tripartite model, defining giftedness as a combination of high intellectual ability, exceptional achievement, and potential for excellence, serves as a fundamental framework for this study. Using Dirichlet's latent assignment model, major research topics were identified, and trends from 2013 to 2023 were analyzed based on 1071 publications in the Web of Science database. The analysis revealed that publications focus on topics such as giftedness, talent management, and educational programs, showing a significant increase in research on these areas over the past decade. Key topics included psychometrics, gifted programs, and environmental factors. The United States, Germany, and Spain led in productivity with prominent publications addressing cognitive and socio-emotional aspects of giftedness. Findings underscore the need for targeted educational interventions, including acceleration and enrichment programs, to address the academic and emotional challenges faced by gifted students. Research is shifting toward understanding the environmental influences on these students, highlighting the importance of supportive educational environment for their success.

1 | Introduction

High ability has been a subject of debate over time. It is estimated that around 6.5% of students in public schools in the United States (between 2004 and 2012) were identified as gifted, with variations in this rate depending on ethnicity, race, and socioeconomic status, being difficult to define the percentage of individuals with high abilities, since different studies have revealed large disparities, since their detection depends on other factors such as parental studies, the race, ethnicity and socioeconomic level, the public or private schools and the country of the student (Worrell et al. 2019).

Research on high abilities addresses several aspects, such as the identification of gifted people, their cognitive, emotional, and social characteristics, which evolve with the individual's experiences and age (Rinn and Bishop 2015). The tripartite model has been one of the most widely accepted frameworks (Pfeiffer and Shaughnessy 2020), defining giftedness as high intellectual ability, outstanding achievements, and potential for excellence.

Summary

- The interest in research on giftedness has increased over the last decade
- "Promotion and enhancement programs" is currently the most productive topic within high skills research
- Mathematical and Psychometric topics have declined, favoring a practical approach aligned with educational and psychological school practices.

High-ability people often have an exceptional ability to learn, understand, and solve problems compared to their peers. Methods such as ability tests, clinical observations, interviews and psychological evaluations are used to identify people with high abilities, but this remains a contentious issue (Hodges et al. 2018; Peters et al. 2021) due to the lack of consensus on questions regarding how, what, when, and why to identify (García Martínez et al. 2021) or the selection of a common method (McClain and Pfeiffer 2012).

Research on high skills (HS) is being carried out on specialized educational programs, differentiated teaching strategies and emotional support to optimize the development and well-being of these students. Gifted students need a different education than average students (Coleman and Cross 2005) due to the higher emotional burden produced by their giftedness, which requires a continued socio-emotional support and a comprehensive environment across their development (Fonseca 2011). Emotional hypersensitivity, problems of integration with society and other problems related to social skills associated with people with high abilities can lead to school failure (Schiltz 2016) and low level of professional success despite the advantage of their high abilities (Schlegler 2022); thus, it is extremely important that research focuses on education plans designed exclusively to address these psychosocial needs (García-Martínez et al. 2021). Among the different educational interventions applied to gifted students, academic acceleration stands out, in its different modalities, which has proven to be one of the most effective measures that does not compromise the social or emotional development of the student (Bernstein et al. 2021; Herrmann et al. 2016).

Definitely, managing high skilled students constitutes a challenge for teachers and education scientists. This challenge requires an educational model that improves the academic performance and development of the most talented students. One effective approach is grouping students with high abilities in programs of different scales and duration (Nicholas et al. 2024). This can range from practical sessions in the classroom to forming part-time or full-time groups at school or during the course (Rogers 2007; Herrmann et al. 2016), as well as working in challenging activities (Preckel et al. 2010). In any case, public administrations must apply strategies to serve gifted students, with the aim of guaranteeing their identification, access, and attention in specialized services (National Association for Gifted Children & Council of State Directors of Programs for the Gifted 2015).

To better understand the current situation of research on high abilities, it is necessary to describe how science has evolved in recent years regarding the subject of studies carried out about students with this condition. Bibliometric studies provide this information and enables analyses that reveal the true nature of a scientific field or, if appropriate, a research topic. Most of the scientific literature about bibliometric studies on HS was published in the last 10 years, but it is scarce. Recent works by Özdemir et al. (2024), Bilgic and Baloğlu (2023) and Gül and Ayık (2024) focus on mathematical and STEM HS, while the work of Parra-Martinez and Wai (2023) included multidisciplinary perspective about talent identification. Hernández-Torrano and Kuzhabekova (2020) conducted a long but limited to four journals bibliometric study. This is the first bibliometric study on HS from a multidisciplinary approach with an in-depth assessment of the recent topic evolution.

This study aims at identifying the evolution of the topics and the main focus of interest of the studies about high-skilled individuals, as well as to detect the lacks of knowledge and to determine the most relevant research trends in the last decade. This study will provide and up-to-date map of research in high-skills for educators, psychologists, researchers, and policy-makers.

2 | Methods

The search strategy was performed on February the 1st, 2024, on Clarivate Analytics' Web of Science, Core collection, Science Citation Index Expanded, Social Sciences Citation Index, & Arts & Humanities Citation Index. The terms included in the search equation were selected to obtain all articles and reviews published on HS (Supporting Information S1: File SI). A total number or 6856 records were retrieved for the period 2013–2023.

After a manual refinement, non-relevant articles were discarded, obtaining a sample of 1071 records. Records from 2023 were excluded in time-dependent analysis because the indexation process in Web of Science for articles published in 2023 was not completed in February the 1st. Exclusion criteria were that the topic was related to biology, medicine, physics, chemistry or public health; when the studies were related to biology or medicine, the research topic was more focused of physiological and neuroanatomical issues, rather than academic and psychological performance. After normalizing author names and institutions, following the procedure of previous studies (Tarazona-Álvarez et al. 2021) the bibliometric indicators as a production and impact were analyzed.

A statistical analysis was carried out, including measures such as a linear regression analysis to assess of the evolution of the growth of scientific production. As a result of this calculation, the slope value to estimate the rate of change between two variables and the Confidence Intervals (CI) to estimate the interval of probable values (95%) of the population were obtained.

The Latent Dirichlet Allocation model (LDA), a generative probabilistic model for collection of discrete data carried out by Blei et al. (2003) was applied. This mathematical analysis, is widely used in studies focus on research progress of a topic. Is an important algorithm in big data analysis for topic modeling, that finds the group of topics in the text data. It posits that each

TABLE 1 | The five topics with their five most frequent terms, obtained following LDA model.

Environment	Gift investigation	Mathematical models	Ability programs	Psychometrics
"School"	"Educ*"	"Learn*"	"Student"	"Children"
"Student"	"Talent"	"Mathemat*"	"Gift"	"Gift"
"Academ*"	"Develop*"	"Abil*"	"Studi*"	"Differ*"
"Achiev*"	"Research"	"High"	"Teacher"	"Test"
"High"	"Gift"	"Process"	"Program*"	"Intellig*"

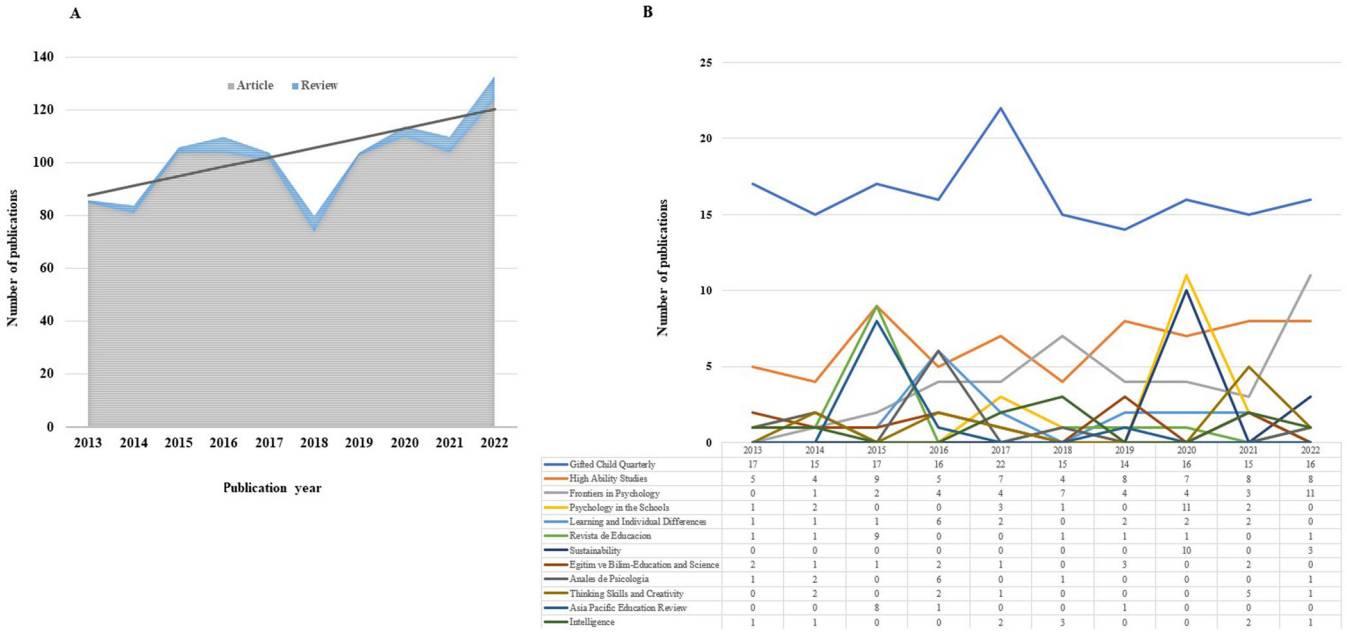

FIGURE 1 | Scientific production evolution according, (A) document type by publication years and linear regression, and (B) publication journal (> 9 publications). *Production of 2023 is not shown due to limitations of updating in the cataloging of publications in the database.

text document consists of a group of topics, and each topic is a mixture of words related to it (Garg and Rangra 2022). The R statistical program was used to obtain the LDA model (Grün and Hornik 2011), which identifies the main topics and the predictive distribution of the topics in each article. Before applying the model, a selection of words was made. The root of the words was considered; subsequently, conjunctions, prepositions, adverbs and numbers were discarded. The final number of words was 7.522. Moreover, the number of topics K was prefixed. After studying the results for the values {3, 5, 7, 10, 15}, it was concluded that $K = 5$ was the best option. The five obtained topics were: "Environment," "Gift investigation," "Mathematical models," "Ability programs," and "Psychometrics," and their five most frequent words are showed in Table 1.

Once the predictive distribution was obtained, the two topics with the highest value of the predictive distribution were assigned to each article and, with this information, a contingency table was created. Thus, a correspondence analysis was performed to study the relationship between the publication years and the topics obtained, as well as a bar plot and a timeline to study the topic evolution.

VOSviewer software was used to study the relationship between the Author keywords of each publication.

3 | Results

3.1 | Scientific Production on HS

A significant increase in the number of scientific publications on high abilities was observed, with a slope value of 3.7 after calculating the lineal regression for the studied period (95% CI = [2.8, 4.5]), being 45.9% and 800% the percentage increase of original articles and reviews respectively (Figure 1A). Following this trend, it is predicted that the number of annual publications will increase by 2.8–4.5 times in 2023 and 2024. Figure 1B shows the evolution of the scientific production published in journals. Gifted Child Quarterly is the journal with the highest number of papers about HS ($n = 168$), followed by High Ability Studies ($n = 70$).

Regarding the most productive authors in the period (Table 2), 8 out of 13 are women.

The distribution of works per country shows that USA is the most productive one followed by Germany and Spain (Figure 2).

The analysis of the authors' affiliations reveals that the 10 first productive institutions are US located Universities, led by the University of Connecticut, followed by the University of Haifa

TABLE 2 | Authors with the highest number of publications.

Author	Affiliation	Country	Works
Preckel, Franzis	University of Trier	Germany	17
Olszewski-Kubilius, Paula	Northwestern University	USA	16
Makel, Matthew C	University of Calgary	Canada	13
Peters, Scott J	University of Wisconsin	USA	13
Matthews, Michael S	University of North Carolina at Charlotte	USA	12
Verschueren, Karine	Catholic University of Leuven	Belgium	12
Wai, Jonathan	University of Arkansas	USA	12
Assouline, Susan G	University of Iowa	USA	12
Worrell, Frank C	University of California	USA	11
Shi, Jian-Nong	Chinese Academy of Sciences	China	11
Sastre-Riba, Sylvia	Universidad de La Rioja	Spain	11
Borges del Rosal, Africa	Universidad de La Laguna	Spain	10
Subotnik, Rena F	American Psychological Association	USA	10

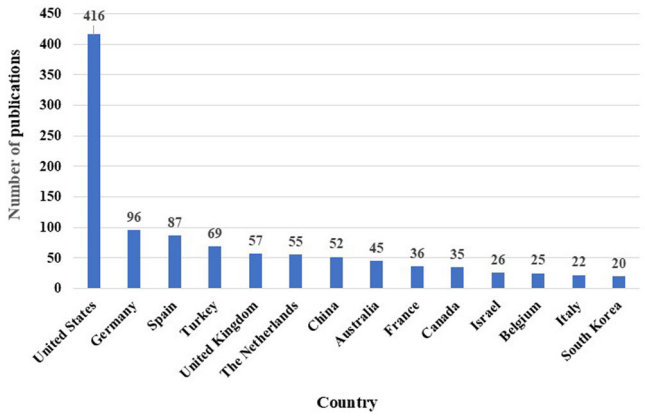

FIGURE 2 | Distribution of works per country of affiliation (> 19 publications).

(Israel) and Universities from European countries like Germany, Spain and The Netherlands (Table 3).

3.2 | Most Predominant Topics in the Area of HS

"Hot Papers" analysis (10 most cited documents) shows that in the studied period the most prominent topics include Academic achievement, Talent management and measurement, as well as Advances in tools to promote motivation in the learning of people with high abilities (Table 4). Similarly, research on the relationship between the environment, the jobs held by people with HS and their contribution to the economic development of a country is also one of the areas that have aroused the greatest interest and accumulated the greatest number of citations.

Along the same lines, the study of Author Keywords (Figure 3) highlights the thematic connection between research on the needs, personality, motivation, and achievements of gifted students. And on the other hand, the identification of high abilities in children, models of education and of developing emotional intelligence and memory among other cognitive skills. Words related to "inequality" are also highlighted, including terms such as "sex-differences," "girls," "equity," or "stereotype threat." In another sense, a group of words related to "special populations" with learning disorders/pathologies/difficulties, such as "autism," "adhd," "dyslexia," "learning-disabilities," or "disabilities" are shown.

3.3 | Trends and Evolution of the LDA Topics

The retrieved documents were grouped into five major LDA topics, Environment ($n = 236$), Gift investigation ($n = 252$), Mathematical models ($n = 145$), Ability programs ($n = 211$), and Psychometrics ($n = 232$). Figure 4A shows the yearly relevance of each topic regarding the number of publications; thus, the percentage of publications per topic was calculated for each year; since throughout the first half of the decade studied (2013–2018) research on Mathematical model remains stable but is losing intensity from 2019 onwards. In contrast, interest in Psychometrics and Ability programs is increasing.

To deepen the evolutionary trends of the studies published in each of the topics, a correspondence biplot analysis was performed (Figure 4B); the distribution of the topics on the axes shows a stable association between the topics of the publications and the chronological evolution, since it presents a variability of 85.8%.

The distribution of the topics in the axes shows that in 2015, 2019 and 2020 the publications on "Research about talent" predominate, while "Environment" becomes stronger in 2014, 2018 and 2021, "Psychometrics" and "Promotion and enhancement programs" gain strength in 2022, leaving the studies on "Mathematic models" protagonists in the years 2013, 2017, and 2019.

To assess the impact of each of the topics, Web of Science citations were analyzed. It was observed that Topic 1,

TABLE 3 | The most productive institutions (> 10 publications).

Institution	Country	Works
University of Connecticut	USA	29
University of California system	USA	29
University of Wisconsin system	USA	22
Duke University	USA	22
University of Iowa	USA	21
Purdue University	USA	21
University of North Carolina	USA	21
Vanderbilt University	USA	17
University of North Texas system	USA	17
Northwestern University	USA	16
University of Haifa	Israel	16
Universitat Trier	Germany	15
Radboud University Nijmegen	The Netherlands	14
Katholieke Univ Leuven	Belgium	13
University of La Rioja	Spain	13
University of La Laguna	Spain	12
University of Virginia	USA	12
University of Tubingen	Germany	11
Aalborg University	Denmark	11
University of Texas system	USA	11
Chinese academy of sciences	China	11
University of Utrecht	The Netherlands	11
Seoul National University	South Korea	11
University of Amsterdam	The Netherlands	11
Columbia University	USA	11

"Environment," stands out with the highest average number of citations, followed by Topic 2, "Gift Investigation" (Table 5).

4 | Discussion

Data retrieved in Web of Science during the period 2013−2023 show that 1071 articles and reviews were published, signed by 2382 authors with about 306 (SD = 0.16) signatures per work from 1034 institutions from 69 countries. The two journals with the highest number of publications, Gifted Child Quarterly and High Ability Studies are those that maintain a stable rate of publications, as they are HS specialized journals. Other journals have exceptional rates of publications in short periods of time, maybe due to monographic issues, but the rest of the time they do not publish about HS. This suggests that, aside from the two mentioned journals, the topic lacks consistency in publication, reflecting the variable interest it generates among educational research teams. This aspect is supported in the recent study by Nicholas et al. (2024), which highlights the need to strengthen research in this area to design effective actions tailored to the needs of individuals, as well as school and contextual variables, among others. This would also help address the limitations in teaching practice, where a lack of content and pedagogical discipline is apparent (Barbier et al. 2019; Chandra Handa 2019).

Despite the older articles are more likely to be cited than the more recent, this study reflects that the three most cited studies in the period were published in 2018 and 2019. Two of them were published in "Economics" category journals and they are both related to human capital and performance. That results in a high interest on HS from companies focused on finding the best workers among gifted students. This interest is also about the possibility to find out the best skills of the employees to reallocate them if necessary to get their best performance. The most cited article, by Bücker et al. (2018), significantly, states that "high-achieving students do not automatically have superior well-being stressing on the value of placement of high ability individuals in environments that are most conducive to their well-being. Regarding the evolution of the scientific production, a significant increase is observed throughout the period, with 2022 being the year with the highest rate of publications in history with a further increase expected in subsequent years.

The production per country of affiliation shows that USA is the most productive country followed by Germany and Spain. These results reflect the extensive history in the United States, with the Marland Report (1972) being a landmark that established the foundations for coherently defining giftedness and talent (Tourón et al. 2024). They are also partially consistent with a previous study from Suelves and cols., showing that USA was ranked first in a study about the use of learning technology by gifted students (Suelves et al. 2020).

About the institutions, the University of Connecticut and the University of California System are the most productive organizations in HS. University of California is a consortium of different and very relevant Universities, thus it is expected to have a high impact in production. Nevertheless, the University of Connecticut is not that big, but its production is similar to University of California, maybe due to the existence of the Renzulli Center for Creativity, Gifted Education, and Talent Development at the Neag School of Education (https://gifted.uconn.edu/). University of Haifa from Israel, ranked 11th, is the first non-US organization on the list, and this organization has also a center addressed to the study of HS: The Youth Center (https://range.haifa.ac.il/the-youth-center/?lang=en). In this sense, The University of Trier (Germany) is the first European university in the production ranking, and it is the organization where the most productive author is affiliated: Franzis Preckel, expert in educating students with HS.

On the other hand, after performing a count of keywords and descriptors resulted that the 16.5% of the articles of this study have a topic related to gender/sex issues, what is

TABLE 4 | Top 10 most cited papers.

Authors	Title	Source	Citations	Author keywords
Buecker et al.	Subjective well-being and academic achievement: A meta-analysis	Journal of research in personality 2018; 74(): 83–94	193	Academic achievement; Academic satisfaction; Life satisfaction; Meta-analysis; Subjective well-being
Hsieh et al.	The allocation of talent and US economic growth	Econometrica 2019; 87(5): 1439–1474	169	Economic growth, discrimination, misallocation, roy model
Wiswall and Zafar	Preference for the workplace, investment in human capital, and gender	Quarterly journal of economics 2018; 133(1): 457–507	146	Workplace preferences, compensating differentials, human capital, college majors, gender
Meyers et al.	Talent—innate or acquired? theoretical considerations and their implications for talent management	Human resource management review 2013; 23(4): 305–321	139	Talent management, nature–nurture, interaction nurture
Mottron et al.	Veridical mapping in the development of exceptional autistic abilities	Neuroscience and biobehavioral reviews 2013; 37(2): 209–228	136	Autism, asperger, savant syndrome, absolute pitch, perception, enhanced perceptual functioning, synaesthesia, hyperlexia, connectivity, veridical mappin
Nijs et al.	A multidisciplinary review into the definition, operationalization, and measurement of talent	Journal of world business 2014; 49(2): 180–191	135	Talent definition, talent operationalization, talent measurement, multidisciplinary review, theoretical propositions
Kerr et al.	Global talent flows	Journal of economic perspectives 2016; 30(4): 83–106	127	Migration, talent, diaspora
Andersen and Ward	Expectancy-value models for the stem persistence plans of ninth-grade, high-ability students: A comparison between black, hispanic, and white students	Science education 2014; 98(2): 216–242	125	No author keywords
Lin-Siegler et al.	Even einstein struggled: Effects of learning about great scientists' struggles on high school students' motivation to learn science	Journal of educational psychology 2016; 108(3): 314–328	116	Beliefs in exceptional scientific talents, scientists struggle story intervention, improving motivation in science learning
Touron and Santiago Campion	Flipped learning model and the development of talent at school	Revista de educacion 2015; (368): 196–231	100	Desarrollo del talento, aprendizaje inverso, enseñanza mixta, diseño universal de aprendizaje

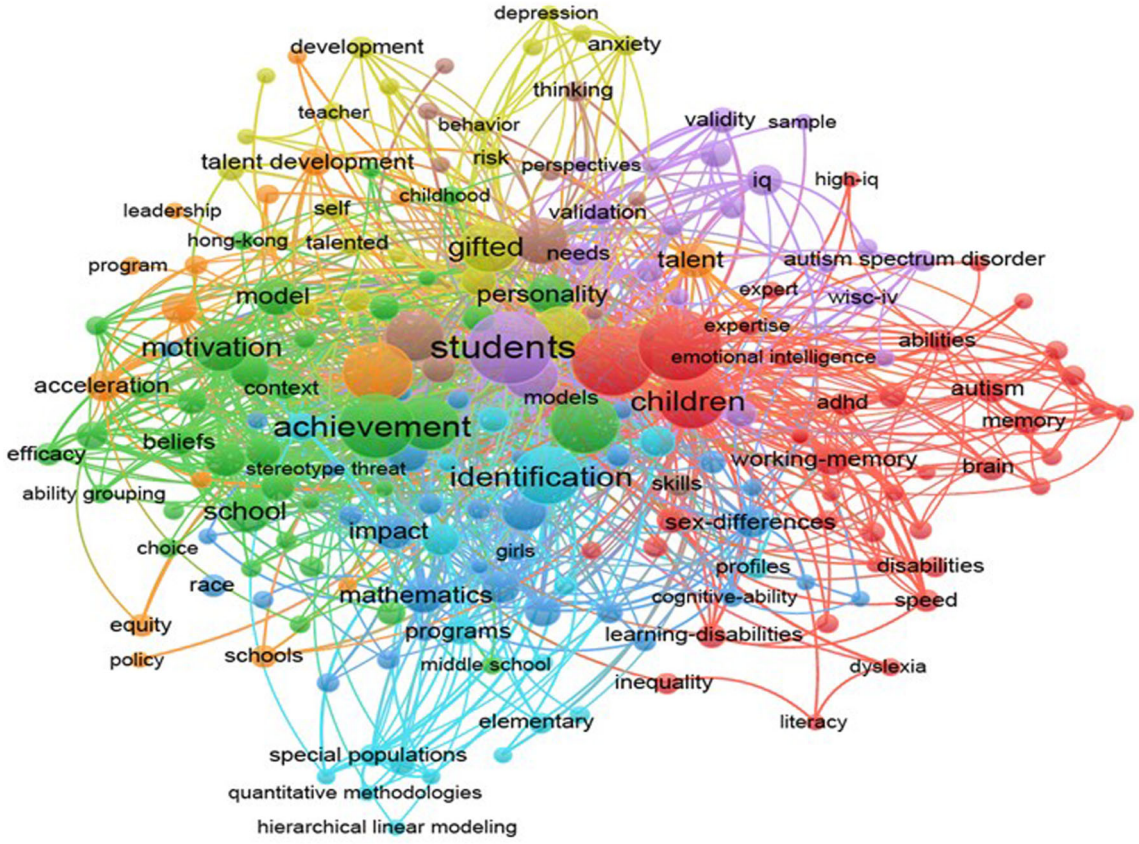

FIGURE 3 | Author keywords network (Vosviewer).

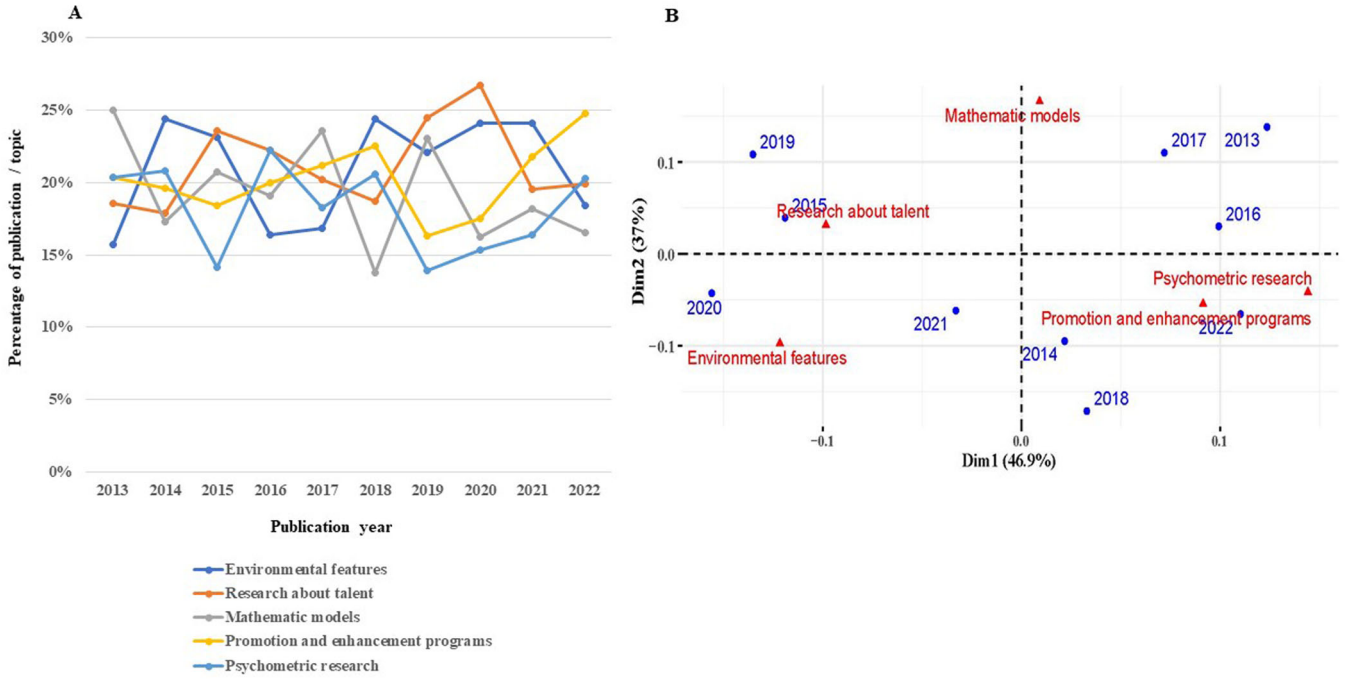

FIGURE 4 | Chronological evolution of publications according to, (A) their thematic categories (*) and (B) correspondence analysis by year of publication. *Production of 2023 is not shown due to limitations of updating in the cataloging of publications in the database.

observed in the specific node containing the terms "inequality," "Sex-differences," "girls," "equity," or "stereotype threat" de la author keywords network, showing that gender perspective in HS research is a relevant issue, as showed in Wang and Yu (2023), whose systematic review found that academic self-concept has a positive influence on achievement, motivation, performance, and self-efficacy, but these effects are moderated by gender.

TABLE 5 | Analysis of the impact of publications for each topic.

Topic	Number of publications	ISI citations	ISI citations/work	Most cited paper per topic (number of citations)
Environmental features (T1)	236	3805	1612	Predictors of attitudes to gifted programs/provisions: Evidence from preservice educators (193)
Research about talent (T2)	252	3265	1295	The education context for twice-exceptional students: An overview of issues in special and gifted education (169)
Mathematic models (T3)	145	1520	1048	Structural brain network of gifted children has a more integrated and versatile topology (125)
Promotion and enhancement programs (T4)	211	1816	8607	Evaluating interventions for young gifted children using single-subject methodology: A preliminary study (81)
Psychometric research (T5)	232	2730	1176	Gifted students with disabilities (136)

The LDA analysis was carried out to find out more about the contents and how the different terms are conforming specific clusters of information, to improve the understanding about the evolution of research interests across the period. Five topics emerged: Environmental features (T1), Research about talent (T2), Mathematic models (T3), Promotion and enhancement programs (T4), and Psychometric research (T5). The most relevant topic currently is T4, and T3 is decreased in the last years. The basic study of HS, which could be represented by Mathematic models (T3) and Psychometric research (T5) has lost relevance, and the public health approach about health promotion and the environmental conditions has earned interest from researchers in the last years of the period. Psychometrics and mathematical models fall within the realm of psychology, and their research often faces limitations due to the demanding process of validating instruments, calculating sample sizes with precision, and adhering to strict administrative constraints. However, work on the environment is a more favorable terrain for dynamic and highly applied research, where educational professionals play a much more relevant role. Faced with a situation where immediacy and efficiency in the use of research resources are increasingly necessary—a scenario that is becoming more common today—it can be anticipated that the use of contextual variables allows for greater ease of acquisition, use, and manipulation, in contrast to quantitative (mathematical and psychometric) techniques, which focus more on measuring academic performance. Therefore, contextual variables may be more suitable for work both inside and outside the classroom by education professionals.

Notably, the most cited article in Environmental Studies examines how cultural orientation, age, and prior experience significantly predict preservice teachers' attitudes toward gifted education.

Following the LDA topic evolution, 2015 was a year when an increase of publications about Research about talent (T2) was observed, which suggests that specialists in HS made a big effort to profile gifted and talented individuals, facing the historical challenge to identify high skilled students at school age and later. To a greater extent, these studies have been boosted by the great interest in describing the warning signs that allow educators in primary schools (early years) to recognize students who present certain characteristic signs of high ability, especially important, studies related to the detection of cases from the earliest possible age (Matthews and Rhodes 2020), as reported in the most cited article on this topic, which examines systemic barriers and explores school-level reforms to improve neuroscience-based education for twice-exceptional students. These results are consistent with those observed in one of the most cited works of this study, where Nijs et al. (2014) highlight the interest during the years 2014-2015 among educators, companies and society, to establish the conceptual framework of "talent" that clarifies its characteristics and its measurement in the absence of previous solid theoretical bases; This study also shows the value it had during this period, for institutions and human resources, to accurately characterize the talent of people to implement talent management of their employees, to maximize the performance of their functions in an outstanding manner.

In the same line, during the same period, publications focused on talent assessment, cognitive skills, physical aptitude and individual characteristics high skilled people also predominate (Parra-Martinez and Wai 2023), as the study of Touron (2015), which is one of the studies with a higher number of citations, and focuses on analyzing the individual and unique needs of each student, so that teachers can address them in a more direct and specific way, thus maximizing the personal development of the individual.

In parallel, in the years 2013, 2016, and 2019, there is a noticeable trend oriented to deepen the knowledge of mathematical modeling (T3), which is an educational model whose pedagogical approach enhances critical thinking and analytical skills through the process of elaborating mathematical

representations to explain and solve real-life problems (Erbaş et al. 2014). In the context of educating gifted students, it is a very useful tool to help them better understand and deal with a real-life problem and to help them make decisions (Kaiser and Schwarz 2010). Mathematical modeling is a key component of STEM knowledge and skills, according to previous research (Urban 2003). In addition, these models are particularly important among the teaching strategies in the education of gifted students, since these individuals have a greater training in mathematical and reflective thinking, thus representing a fundamental pillar to realize their productive capacity and efficiency (Özbek and Cho 2023). On the other hand, the scientific literature shows that the recognition of the capacities and levels of mathematical modeling skills of gifted students, as well as the interrelationship between these skills, has provided valuable data on the pedagogical requirements and provisions necessary to promote their growth (Özbek and Köse 2022). Moreover, it is also important to highlight the studies that employ different mathematical models to better understand the characteristics of gifted students. For example, the most cited study in this topic (T3) uses mathematical models from graph theory to show that gifted children have more integrated and versatile brain network topologies.

Subsequently, in 2018, 2020, and 2021, the topic of "environment" is gaining interest in the scientific and educational community, highlighting the importance of the environment for the proper development of high-ability students (Schneider and Preckel 2017). This study shows that there is a relationship between the success of gifted in the development of university studies in STEM and their environment during their stage in high school (demographic area, ethnicity and personal motivations). These results are consistent with our results, as is observed an upward trend in the number of studies carried out on this subject in recent years which could be explained by the substantial value of STEM talent development for a country's social, economic, scientific, and technological advancement (Türk et al. 2018) and as a means to achieve the Sustainable Development Goals (MacDonald and Huser 2020).

The psychometric research (T5) in this area is aimed at identifying the most exceptional students by focusing on quantifying, evaluating, and validating through various metric tools (tests, timed tests, performance tests, etc.) (Al-Hroub 2021). The psychometric results allow educators to guide the next steps in learning that are most appropriate for each individual. (Kaufman et al. 2016), as discussed in the most cited article in the field of psychometrics, which identifies different cognitive profiles and support needs of students with dual exceptionalities through diagnostic differentiation. Despite the extensive literature found in our study (232 documents), researchers agree that there is currently no single validated test or instrument that addresses this need (Ersoy and Deniz 2016). Furthermore, as quantitative approaches are losing their relevance in the research scope, new methodological approaches, such as the employment of qualitative assessment techniques, are recommended.

Numerous studies show a direct correlation between social interaction among high-ability students and their academic achievement (T4). Similarly, achievement is closely linked to fostering deep learning through clear presentation of content, its connection to students, and the implementation of challenging conceptual tasks. (Schneider and Preckel 2017). In this sense, previous research shows that despite the various programs designed and implemented specifically for students with high abilities, these programs are not enough to address motivational and emotional issues, such as decreased self-confidence and feelings of social exclusion, among other challenges (Kitsantas et al. 2017.). For this reason, it is advisable to design interventions based on scientific evidence, considering the specific characteristics of these subjects (Pfeiffer 2021). This justifies that research in recent years has focused on developing new programs to improve the performance of these individuals while strengthening the socio-emotional aspects in which they are most vulnerable. Among the various programs (Hong and Aqui 2004), classes, multilevel classes, separate full-time classes, retreat programs (Van der Meulen et al. 2014), single-subject design (as noted in the most cited article on this topic), enrichment and acceleration programs (Gross 2006; Kitsantas et al. 2017). Definitely, addressing giftedness cannot remain a no-man's land between teachers and mental health professionals, but requires comprehensive action by both groups.

As the main limitation of the study, it should be highlighted that textual analysis tools, such as LDA, are subject to bias, due to the inevitable dependence on the quality of textual data and the potential lack of accuracy in the keyword selection.

Addressing the ethical and social challenges in research on gifted students involves recognizing their diversity, protecting their emotional well-being, and ensuring that research practices promote equity, avoiding stigma, elitism, or exclusions that could affect their overall development and social integration. The analysis of the data in this study has revealed a higher frequency of studies focused on contextual variables, to the detriment of research on academic achievement. It is therefore interpreted that research on giftedness is oriented toward enhancing individuals' overall well-being, beyond their academic performance, which in turn fosters greater equity and social integration.

The results of this study show that interest in research on giftedness has increased over the last decade, and within the five most relevant topics, Promotion and enhancement programs is currently the most productive in the studied period. It seems like recently the mathematical and psychometric subjects have lost relevance in favor of a most applied approach, closer to the educational and psychological practices in schools, as well as topics related to equity, which are emerging strongly in publications. United States and Germany remain the countries with the highest number of scientific articles, confirming that they are the countries with a higher involvement in the study of HS.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that supports the findings of this study are available in the supporting material of this article.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section.