Neuroscience, educational practice and circulation channels as articulating axes of neuromyths in education: bibliometric analysis

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Abstract: With the aim of mapping the current state of research on neuromyths, a systematic search was conducted in the Scopus database, yielding 166 records. The data were processed using bibliometric techniques and the VOSviewer tool, which allowed for analysis of the geographical distribution of publications, the volume and temporal growth of scientific production, and identification of the authors and journals with the greatest impact in the field. Based on this analysis, three main research clusters were identified: the first, called Neuroscience, focuses on terms related to the conceptual and empirical basis of the field; the second, Education, groups together concepts associated with the school context and teaching practice; and the third, Information Circulation Channels, articulates the processes of dissemination, appropriation, and distortion of neuroscientific knowledge. The findings reveal a field in consolidation, with sustained growth and well-defined geographical foci, although with significant methodological and contextual gaps. Based on this synthesis, a research agenda is proposed that guides priority lines for the future development of the area..

Keywords: Neuroscience, Education, Scientific literacy, Dissemination of knowledge, Neuromyths

Introduction

The relationship between neuroscience and education has generated a fertile field of research, but also fertile ground for the proliferation of unfounded beliefs about brain function and its pedagogical application. These conceptual errors, called neuromyths , are not individual, mistakes that can be corrected with information: recent studies document their high prevalence among various educational stakeholders, their resistance to change even in highly educated populations, and their translation into concrete pedagogical decisions. Simoes et al. (2022), in a study with 1,634 Brazilian teachers, found that 47.7% held the myth of 10% brain use; Amran and Sommer (2025) documented that 75% of Malaysian teachers believed in the myth of visual-auditory-kinesthetic learning styles and that 80% of that group actively applied it in their teaching. These data illustrate the magnitude of a phenomenon that, far from diminishing with the advancement of neuroeducation, is consolidating itself as one of its most persistent structural problems.

Research has advanced in characterizing the factors that modulate the relationship between belief and pedagogical practice. Fernández et al. (2025), in a study of 3,158 Spanish teachers, indicated that the endorsement of ideas such as the superiority of pure discovery learning can contribute to the reproduction of educational inequalities, disproportionately affecting students in more vulnerable contexts. Adiguzel et al. (2025), in turn, documented in eleven countries that more than 35% of primary school teachers incorporate scientifically unsupported beliefs into their daily instruction, evidence that the phenomenon has a global reach and is not exclusive to contexts with less educational development. These findings underscore that neuromyths are not simply individual cognitive errors, but rather possess an ethical and structural dimension.

Alongside the question of prevalence, research has begun to map the channels through which neuromyths circulate, take root, and persist. Sazaka et al. (2024) identified teacher training workshops, teaching materials, and social media as the main vectors of transmission, revealing that initiatives presented as based on the science of learning actually function as mechanisms for institutionalizing erroneous beliefs. Voulgari et al. (2025), in a longitudinal comparison between 2015 and 2024, found an increase, not a decrease, in the prevalence of all neuromyths measured among Greek teachers, evidence that the quantitative expansion of training opportunities has not translated into improvements in their epistemological quality. More recently, Richter et al. (2025) have documented that artificial intelligence language models reinforce neuromyths when questioned from the user's implicit assumptions, configuring an emerging channel of algorithmic-scale neuroscience misinformation. Racionero-Plaza et al. (2023) add a relevant conceptual distinction between neuromyths, falsehoods transmitted by trainers without neuroscientific knowledge, and neuroedumits, real concepts from which empirically unsustainable pedagogical consequences are drawn, pointing out that part of the problem lies not in the ignorance of teachers, but in the errors of those who train teachers.

Despite the advances described, the field presents significant gaps, especially from a Latin American perspective. Cerezo García et al. (2026) conducted the first large-scale comparative study in Latin America contrasting the beliefs of teachers with those of neuroscience experts, demonstrating that gaps in neuroscience literacy are conditioned by socio-structural factors such as geographic region, type of institution, and level of urbanization. Sarmiento-Peralta et al. (2024) documented statistically significant differences in the endorsement of neuromyths in Peru according to the type of university and geographic origin, framing the problem within the context of university social responsibility as an institutional dimension. In the Colombian context, Ávila-Toscano et al. (2022) confirmed that age was the strongest predictor of neuromyth endorsement and that only regular reading of indexed journals and neuroscience courses in undergraduate studies acted as protective factors. These fragmented and still scarce pieces of evidence underline the urgency of a systematic look at the state of the countryside in the region.

Given this scenario, bibliometric analysis stands out as a valuable tool for mapping the intellectual architecture of this field. Scientometrics, understood as the quantitative study of scientific development as an information process (Nalimov and Mulchenko, 1971), has given rise to two widely used branches: bibliometrics, which allows for the evaluation of the impact of publications (Cobo et al., 2011) and the scientific productivity of authors, institutions, and journals through indicators such as citation counts (Garfield, 1955) and the h- index (Hirsch, 2005); and scientific mapping, which deciphers the intellectual structure of a field through co-citation techniques, co-word analysis , and network visualization (Donthu et al., 2021; Zupic and Čater , 2015). These procedures will be applied to the Scopus database , selected for its coverage of over 76 million records (Baas et al., 2020) and its recognized superiority in scope and indexing accuracy (Harzing and Alakangas , 2016; Mongeon and Paul-Hus, 2016). To date, there is no comprehensive mapping that integrates the neuroscientific , pedagogical, and socio-interactional dimensions of this field for the period 2022–2026.

This study analyzes global scientific production on neuromyths in education during the period 2022–2025 using bibliometric analysis, with the aim of identifying how neuroscience, educational practice, and the circulation of information shape the key elements that structure the field. Three specific objectives are pursued: (a) to characterize the scientific production and its main actors, describing the volume, temporal growth, geographical distribution, and the authors, journals, and institutions with the greatest impact; (b) to map the key elements by analyzing co-citation and co-occurrence networks of keywords using VOSviewer , examining how the three dimensions emerge as interconnected structures; and (c) to identify research gaps and project emerging trends, with an emphasis on the Latin American context, in order to formulate a future research agenda based on the bibliometric findings. In a context where the expansion of training offers does not guarantee the reduction of neuromyths (Voulgari et al., 2025) and where artificial intelligence emerges as a new channel of misinformation (Richter et al., 2025), this work aims to contribute to the consolidation of a critical, situated and scientifically responsible neuroeducation.

Methodology

Scientometrics, introduced by Nalimov and Mulchenko (1971) , addresses the investigation of the development of science through the application of quantitative methods, focusing on science as an information process. Two of its most widely used branches are bibliometrics and scientific mapping, which facilitate the visualization and interpretation of metrics related to scientific literature, based on bibliographic data (J. Li et al., 2021) .

Bibliometric analysis is primarily used to evaluate the impact of publications (Cobo et al., 2011) , and the scientific productivity of authors, institutions, journals, and countries, through indicators and metrics of publication and author impact, such as citation count (Garfield, 1955) and the h- index (Hirsch, 2005) . This tool contributes to the progress of science because it allows us to discover information in many different ways: enabling us to evaluate the progress made, identify the most reliable sources of scientific publication, lay the academic foundations for the evaluation of new developments, identify the main scientific actors, and develop bibliometric indices to evaluate academic output (Gutiérrez- Salcedo et al., 2018) . Therefore , bibliometrics has become an essential tool for understanding most scientific areas in detail (Martínez et al., 2015) .

Furthermore, scientific mapping analysis plays a crucial role, as it is dedicated to deciphering the intellectual structure of a particular field, and it achieves this by examining the social and structural interconnections between different elements of the research (Donthu et al., 2021; Zupic & Čater , 2015)

, thus allowing the identification of patterns and trends in an area of knowledge (Chen, 2017; Leydesdorff , 1987; Noyons et al., 1999) , based on various units of analysis such as: author analysis co-citation analysis (Chen, 1999; White & McCain, 1998) , document co-citation analysis (Small, 1973) , co-word analysis (Callon et al., 1983) . Also, techniques for network visualization (Herman et al., 2000) .

These types of procedures and techniques have gained popularity in the scientific community due to their ability to process and analyze large volumes of data, allowing researchers to identify evolutionary trends in specific fields (Donthu et al., 2020, 2021) and shed light on emerging areas of research (Verma & Gustafsson, 2020) . Additionally, the increasing availability of databases containing citation data and the development of improved analytical tools are increasing their appeal among academics and researchers (Dominko & Verbič, 2019).

Therefore, the general objective of this type of research is to obtain information about the development of scientific research on a specific topic, a broader research domain, or even the entire scientific body of knowledge (J. Li et al., 2021) . Although these techniques have a quantitative basis, they are often applied to make inferences about qualitative characteristics (Wallin, 2005) .

Finally, given the requirements of this research and the objectives already established, bibliometric procedures and scientific mapping analysis will be used to address it.

Database selection.

Scopus database was selected as the primary bibliographic source. This choice is based on its recognition as one of the most preeminent sources in the current academic field (Pranckutė , 2021) . Scopus stands out not only for its extensive coverage, with more than 76 million documented records (Baas et al., 2020) , but also for its scope, quality, and precision in indexing sources (Mongeon & Paul-Hus, 2016) , making it an invaluable tool for researchers in various disciplines. Furthermore, several studies (Harzing & Alakangas , 2016; Zhu & Liu, 2020) have highlighted Scopus 's superiority over other databases in various comparative aspects, considering it the best database worldwide.

Keyword selection.

The search equation was formulated using key descriptors combined with Boolean operators, applied to the title, abstract, and keyword fields, limiting the results to publications between 2022 and 2025: *(TITLE-ABS-KEY (" neuromyths ") AND TITLE-ABS-KEY (" Education "))* . This allowed filtering only for documents that included the term " neuromythst " in English, since Scopus indexes a significant proportion of literature in that language, thus aiming to retrieve a greater number of relevant and up-to-date publications. Regarding the type of document, the search was limited to peer-reviewed scientific articles.

Inclusion criteria.

Table 1 lists the criteria used for the search in the database.

Table 1

Search parameters

Feature	Criterion
Look for in the results	Title / Keywords
temporal space	All the registrations until 2025
Date of consultation	18/02/2026
Database	Scopus
Search topic	Neuromyths in education
Types of documents	Articles
Language	English
Results	166

Analysis bibliometric .

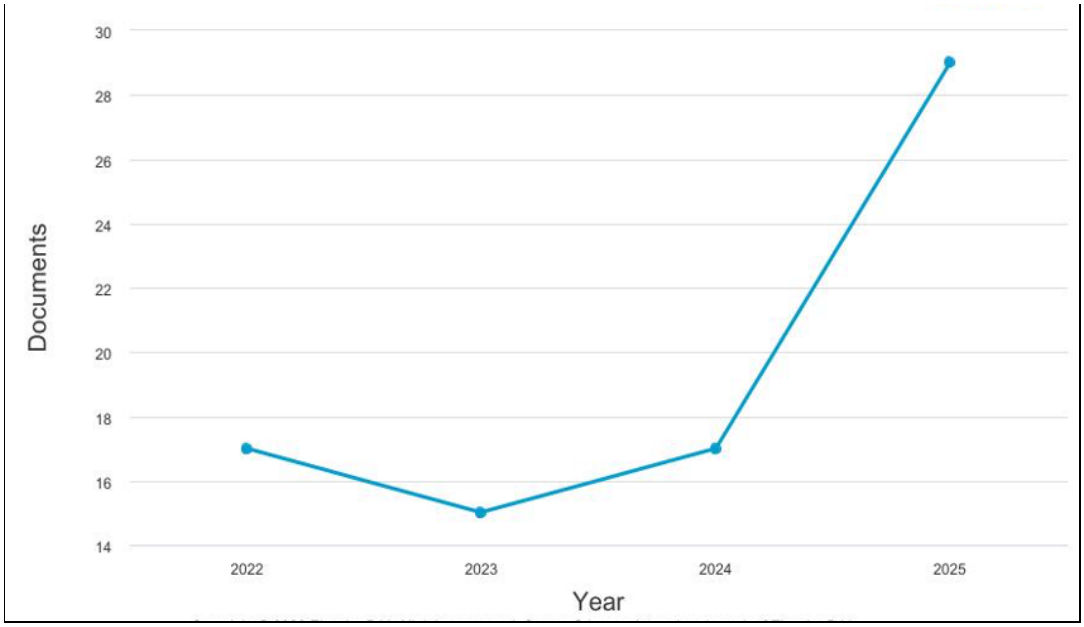
VOSviewer package was used , a tool employed for the construction and visualization of bibliometric maps (van Eck & Waltman, 2010) . This application is widely used for this type of analysis due to its ability to process large volumes of data, work with diverse databases, and present the clusters and the evolutionary map of the field in a clear manner (van Eck & Waltman, 2017) . Furthermore, VOSviewer is a translated package widely used by the scientific community (Donthu et al., 2021) .

Results

Bibliometric analysis.

Scopus database . **Figure 1**

Publishing trend by year



The publication trend on neuromyths in education recorded in Scopus for the period 2022–2025 describes a curve with three clearly differentiated phases. The year 2022 marks the starting point with 17 documents, followed by a slight contraction in 2023 (15 documents), which could be interpreted as a period of thematic consolidation after the initial post-pandemic surge. From 2024 onward, a recovery

is observed, reaching 17 documents again, before experiencing exponential growth in 2025 to 29 documents, representing a 70% increase compared to the previous year and a 71% increase compared to the beginning of the analyzed period. This accelerated upward trend in the last year suggests that the field of research on neuromyths in education is in a phase of sustained expansion, with growing attention from the international scientific community, which lends relevance and timeliness to the present study as it is situated within a field undergoing consolidation and a period of intense research activity.

Featured authors.

Figure 2

Co-citation network of authors in neuromyth research

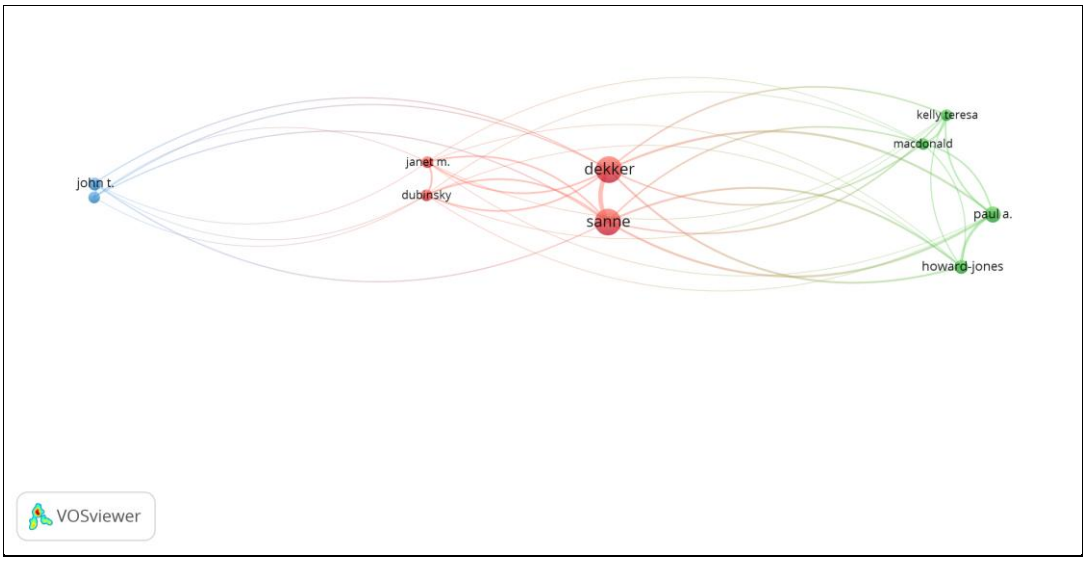


Figure 2 represents the co-citation map of authors generated using VOSviewer software , based on data extracted from the database selected for bibliometric analysis. The size of the nodes indicates the citation frequency of each author, while the thickness of the lines represents the strength of the co-citation link . The colors correspond to clusters automatically identified by the software's clustering algorithm, reflecting intellectual communities within the field. Proximity between nodes indicates a greater structural relationship in the analyzed literature. The red cluster concentrates authors with a greater focus on the theoretical discussion of neuromyths , while the green and blue clusters reflect complementary lines of research linked to empirical studies and specific approaches within the area.

Table 2 presents the most prominent authors in the field, whose relevance is based on their citations. The most important seminal authors are: Vig, Julianna, Kälbli , Katalin, and Csányi, Tamás, all with 19 citations.

Table 2

Most productive authors and citation level in neuromyth studies

Author	Documents	Citations
Tadielo , Ana Luiza Trombini	3	7
Carpes , Pamela Billig Mello	4	9
Csányi, Tamás	3	19
Kälbli , Katalin	3	19
Vig , Julianna	3	19

Regarding productivity per author, a balanced distribution in the number of publications is observed (between 3 and 4 documents). However, Csányi, Kälbli , and Vig have the highest number of citations (n = 19), suggesting a greater academic impact of their contributions. Carpes has the highest number of documents (n = 4), while Tadielo has a lower relative citation rate. These findings demonstrate a field in consolidation, with distributed participation and differentiated levels of scientific influence.

Featured magazines.

Scopus publications , identifying the 10 most prolific journals from the database. It includes the quartile, which indicates the journal's impact and quality; the H-index, which shows the number of citations; the SJR 2024 index, which measures the average scientific impact of articles in a journal; and the country of origin of each journal.

Trends in Neuroscience and Education publications rank first with 16 publications. Regarding the H-index, the journal with the best impact indicators is Brain Sciences from Switzerland, which has an H- index of 78 and is in the second quartile (Q2) of SCImago .

Table 3

Ranking of journals by impact metric: the one that publishes the most and the one with the highest index

Position	Magazine	Quartile /H-index/SJR 2022	Documents	Citations	Country
1	Trends in Neuroscience and Education	Q1/35/1,11	16	82	Alemania
2	Brain Sciences	Q2/78/0,89	3	32	Suiza
3	Teaching and Teacher Education	Q1/170/1,70	3	15	Reino Unido

4	Advances in Physiology Education	Q2/78/0.39	3	9	Esta dos Unidos
5	Communications in Computer and Information Science	Q4/75/0,182	3	0	Ger many

Source: Prepared by own .

Note: Prepared by the author based on bibliometric analysis performed using VOSviewer .

The results show that *Trends in Neuroscience and Education* has the highest number of documents (n = 16) and citations (n = 82), demonstrating its leadership in scientific production on neuromyths at the intersection of neuroscience and education. Other journals such as *Brain Sciences* , *Teaching and Teacher Education* , and *Advances in Physiology Education* has a lower volume of publications, although it maintains a relevant level of citations. In contrast, *Communications in Computer and Information Science* shows no citations, suggesting that the topic is still in its early stages in this field. Overall, the evidence indicates that the debate on neuromyths is concentrated primarily in journals specializing in educational neuroscience.

Featured countries.

Table 4

Country	Documents	Citations	Total Link Strength
Spain	13	46	0
United Kingdom	11	82	0
Brazil	8	34	0
Canada	8	86	0
Germany	8	47	0
United States	7	38	0
Chili	5	41	0
France	5	13	0
Turkey	5	9	0

neuromyth research

Note. Prepared by the author based on the bibliometric analysis performed using VOSviewer .

The results show an international distribution of scientific output on neuromyths . Spain has the highest number of documents (n = 13), followed by the United Kingdom (n = 11). However, in terms of citations, Canada (n = 86) and the United Kingdom (n = 82) have the highest relative impact, suggesting greater visibility and academic influence of their research.

Brazil, Germany, and the United States show intermediate participation in both production and citations, while Chile, France, and Turkey have lower volumes of documents and citations. Overall, the data indicate that neuromyth research is concentrated primarily in European and North American contexts, with an emerging presence in Latin America, reflecting a progressive expansion of the field across diverse sociocultural environments.

Tabla 5

Relevant papers

Position	**Title/Reference**	**Citations**	**Author Keywords**
1	How to prepare preservice teachers to deal with disruptions in the classroom? Differential effects of learning with functional and dysfunctional video scenarios (*Tan, Yuen Sze Michellea* ;Amiel, Joshua Johnstone, 2022)	46	Teacher education; classroom disruptions; staged-videos; intervention; professional vision
2	Tenacious educational neuromyths: Prevalence among teachers and an intervention (Ruiz-Martín et al., 2022)	27	False beliefs; Misconceptions; Neuromyths; Teacher education; Training impact
3	Neuromyths: Misconceptions about neurodevelopment by Italian teachers (Bei el al.; 2024)	17	Neuromyths Neurodevelopmental disorders Education Teacher education
4	Effect of a Science of Learning Course on Beliefs in Neuromyths and Neuroscience Literacy (Roberto A. Ferreira & Cristina Rodríguez, 2022)	17	science of learning; education; educational neuroscience; neuromyths; misconceptions; neuroscience literacy; pre-service teachers; mind; teacher training; learning styles

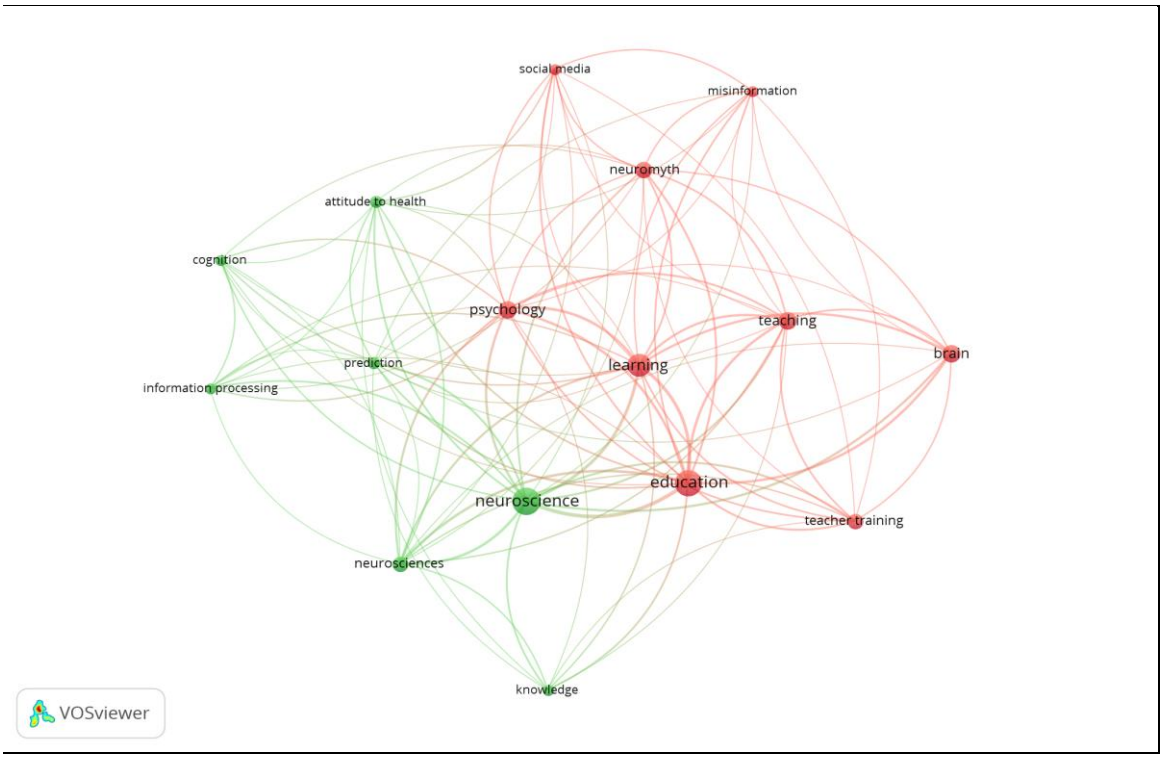
5	The persistence of matching teaching and learning styles: A review of the ubiquity of this neuromyth, predictors of its endorsement, and recommendations to end it (Brown, Stephen B.R.E., 2023)	16	Neuromyth; Learning styles; Meshing hypothesis; Matching teaching and learning styles; Educational neuroscience

Analysis of the five most cited documents in the bibliometric corpus reveals that neuromyths in education constitute a structural phenomenon whose persistence is not due to individual teacher ignorance but rather to training systems, dissemination channels, and institutional practices that legitimize and reproduce them. Tan and Amiel (2022) demonstrate that teachers' prior beliefs operate as cognitive filters that condition their interpretation of pedagogical situations, while Ruiz-Martín et al. (2022) confirm that these false beliefs show particular tenacity in the face of corrective training interventions. Bei et al. (2024) delve deeper into this issue by identifying that misconceptions about neurodevelopmental disorders directly affect educational inclusion practices, demonstrating that neuromyths produce concrete pedagogical consequences. Ferreira and Rodríguez (2022) demonstrate that, while extended training in Learning Sciences improves neuroscientific literacy, reducing specific myths requires explicit and sustained refutation strategies. Finally, Brown (2023) confirms that the neuromyth of learning styles, despite lacking empirical support, continues to be legitimized through multiple media and institutional channels, making it essential to analyze the mechanisms of circulation as a central axis to understand its impact on educational practice.

Featured research topics.

Figure 3

Network of co-occurrence of terms in neuromyth research .



keyword co-occurrence map , based on terms extracted from the documents analyzed in the selected database. The size of the nodes represents the frequency of occurrence of each term, while the thickness of the lines indicates the strength of the link between the terms. The colors correspond to thematic clusters automatically identified by the software's clustering

algorithm. The red cluster groups concepts associated with the educational field and the flow of information (*learning* , *education* , *teaching* , *neuromyth* , *misinformation*), while the green cluster concentrates terms linked to the neuroscientific conceptual basis (*neuroscience* , *cognition* , *information) . processing*). Proximity between nodes indicates greater semantic relationship and co-occurrence in the analyzed documents.

Cluster 1

Neuroscience

A systematic analysis of recent neuroeducation literature identifies three key areas of critical gaps: (1) neuromyths and neuroscience literacy, (2) teacher training in neuroscience, and (3) the application of scientific findings to pedagogical practice. The field has made considerable progress in documenting the prevalence of neuroscientific misconceptions among various educational stakeholders; however, significant geographical, demographic, and instrumental gaps persist, limiting our understanding of the phenomenon and our ability to design effective educational responses. The integration of Latin American perspectives, still in its early stages, is a priority for the development of a truly global neuroeducation (Cerezo García et al., 2026; Simoes et al., 2022).

Research on neuromyths has increased significantly over the past two decades; however, it shows a marked concentration on practicing or pre-service teachers, with a notable absence of studies focused on early childhood educators. Williams et al. (2025) documented that only 23% of this population had received adequate neuroscience training, a particularly concerning gap given that Simoes et al. (2022), in a study of 1,634 Brazilian teachers, found that early childhood educators consistently showed the lowest scores in neuroscience knowledge and the highest rates of neuromyth endorsement ($p < .001$), precisely during the most critical period for identifying developmental difficulties. From a geographical coverage perspective, Cerezo García et al. (2026) constitute the first large-scale comparative study in Latin America that contrasts the beliefs of teachers with those of neuroscience experts, showing that gaps in neuroscience literacy are not only individual phenomena, but are conditioned by socio-structural factors such as geographic region, type of educational institution and level of urbanization.

Regarding measurement instruments, the analyzed studies show a predominance of dichotomous true/false scales, which, although widely validated, have limitations in capturing the complexity of the phenomenon. Deibl and Zumbach (2023) incorporated a third response option—"I don't know"—along with self-confidence scales, revealing that self-confidence in evaluating truthful neuroscientific statements was significantly associated with greater correct identification among advanced students ($F[1,74] = 15.564$, $p < .001$), pointing to metacognition as a relevant variable in neuroscience literacy. At the same time, the studies agree in documenting that certain neuromyths show high resistance to change even in highly educated populations: Simoes et al. (2022) reported that 47.7% of Brazilian teachers still believed in the myth of 10% brain use, while Balmaseda-Serrano et al. (2025) found that beliefs such as hemispheric dominance and learning styles persist in groups with psychology training. Cerezo García et al. (2026) also point to the emergence of new categories of neuromyths associated with healthy habits, neurodevelopmental disorders, and mindfulness, which demands the continuous updating of measurement instruments given the dynamism of the field and

the low-quality scientific dissemination in digital media.

Initial and ongoing training in neuroscience represents one of the most critical and neglected areas of the field. The reviewed literature converges on the fact that mere exposure to neuroscientific content does not guarantee a reduction in neuromyths or the development of competencies for well-founded pedagogical practice. Cerezo García et al. (2026) found, paradoxically, that teachers with formal university training in neuroscience showed higher rates of endorsement of neuromyths than those who had accessed the field through other means, a finding consistent with the Dunning-Kruger effect documented by Deibl and Zumbach (2023), who found no significant differences between first-year students and master's students in the correct identification of neuromyths ($F[1,151] = 0.423$, $p = .516$), indicating that several years of conventional teacher training did not significantly reduce erroneous beliefs about the brain. In contrast, Ferreira and Rodríguez (2022) provided experimental evidence that specifically designed programs with integrated content from developmental psychology, cognitive psychology, and neuroscience produce significant reductions in neuromyths with medium-to-large effect sizes, supporting the thesis that content and structure matter more than mere formal exposition (Sortwell et al., 2023).

In the area of continuing education, Williams et al. (2025) reported that 72% of educators had participated in some type of professional development related to neuroscience, although no information was available on the quality or scientific rigor of these programs. This warning is especially relevant in the Latin American context: Arévalo et al. (2022) identified more than 400 neuroscience or neuroeducation courses available online in Brazil, of which less than 10% were associated with accredited institutions, suggesting that the growth of low-quality programs contributes to the expansion of neuromyths rather than their reduction. The successful experiences documented by Tan and Amiel (2022)—based on the learning approach—are not the only ones that can be addressed. The study with collaborative pedagogical reflection—and by Neves et al. (2024) in Brazil—whose Neuroblitz program sustained significant effects one year after the intervention—offer contextualized training models whose depth and pedagogical anchoring contrast with the logic of short dissemination courses and are configured as references for the design of interventions in Latin American contexts with limitations of face-to-face access.

Perhaps the most significant and persistent gap in the neuroeducational literature is the lack of robust evidence linking teachers' neuroscience literacy to observable and measurable changes in pedagogical practices and, beyond these, in student learning outcomes. This constitutes the so-called "missing link" of neuroeducation: Simmers and Davidesco (2024) documented a positive correlation between pre-service teachers' neuroliteracy and knowledge of evidence-based practices, but this association does not allow for inferring causality or establishing whether changes in knowledge translate into lasting modifications in practice. Gholami et al. (2022), using structural equation modeling with 345 Iranian teachers, demonstrated that knowledge of neuroplasticity directly predicted a growth mindset, which in turn predicted more constructivist epistemological beliefs and a greater orientation toward reflective practices, providing a plausible causal chain between neuroscience training and pedagogical transformation. However, Cerezo García et al. (2026) explicitly point out the absence of longitudinal studies that demonstrate the negative impact of neuromyths on students' academic achievement, a gap between logical argument and direct empirical evidence that represents one of the biggest methodological challenges in the field.

Cluster 2

Education

A key analytical distinction that emerges from the studies included in this cluster is the difference between cognitively endorsing a neuromyth and actively applying it in pedagogical practice. While most research on neuromyths is limited to measuring the prevalence of beliefs, a subset of studies goes a step further by investigating whether these beliefs translate into concrete instructional decisions in the classroom. The findings of this group are consistently troubling and raise fundamental questions about the effectiveness of current teacher training strategies.

The most direct evidence comes from the study by Amran and Sommer (2025), conducted with 501 teachers at various educational levels in Malaysia. Their results showed that 75% of participants believed in the visual-auditory-kinesthetic learning style myth, and that, of that group, 80% reported actively applying it in their teaching. This finding is particularly relevant considering that the authors found a positive and significant correlation between belief in neuromyths and their application in the classroom, demonstrating that these misconceptions are not abstract or inactive representations, but rather have direct pedagogical consequences with a potential impact on the quality of teaching.

Along these same lines , Sazaka et al. (2024) documented in Brazil that approximately 30% of the teachers in their sample admitted to using strategies based on neuromyths in their daily practice, and that this proportion remained relatively stable among pre- service teachers, in-service teachers, and the general public. This result suggests that professional status and accumulated experience do not, on their own, act as critical filters capable of interrupting the transfer of erroneous beliefs into practice. A distinctive contribution of this study is that most participants recalled with relative accuracy the origin of the neuromyth they applied, primarily citing instructional materials, training courses, and social media as sources of learning. This traceability of the source has significant strategic value for the design of targeted interventions.

A divergent but equally illustrative perspective is offered by Tsang et al. (2024), who worked with 64 inclusive education teachers in Hong Kong and found no significant correlation between belief in neuromyths and reported pedagogical practices. The authors propose that this result is explained by the strong government control over teaching practice in Hong Kong: teachers must strictly adhere to official guidelines and directives, which limits the scope for personal beliefs to translate into instructional decisions. This finding contrasts with that of educational systems with greater teacher autonomy, such as those in Malaysia, Brazil, or Spain, where the gap between belief and practice is considerably more porous. The comparison between these two contexts underscores that the relationship between neuromyth and practice is neither direct nor universal, but rather mediated by institutional and systemic factors.

For their part, Fernández et al. (2025), in their study of 3,158 Spanish teachers, expand on this discussion by pointing out that the relationship between misconceptions and practice has implications that go beyond individual instructional quality. The endorsement of ideas such as the superiority of pure discovery learning or the effectiveness of student retention can actively contribute to the reproduction of educational inequalities, given that these practices disproportionately affect students in contexts of greater socioeconomic vulnerability. In this sense, neuromyths are not simply pedagogical errors of individual scope, but rather have an ethical and structural dimension that research has begun to reveal.

In the broader international context, Adiguzel et al. (2025), in their study with 1,257 primary school teachers from eleven countries, noted that more than 35% of teachers confess to incorporating

beliefs without scientific support into their daily instruction, indicating that the phenomenon of the translation of neuromyths into practice is global and not exclusive to contexts with less development of teacher training.

Taken together, these studies suggest that belief in neuromyths is a relevant, though not deterministic, predictor of pedagogical practice, and that the strength of this relationship is modulated by the degree of teacher autonomy, institutional culture, workload, and the presence or absence of curriculum supervision mechanisms. These findings support the need for interventions that go beyond simply correcting beliefs at the declarative level, and instead accompany teachers in the process of reviewing and transforming their classroom practices, recognizing that changing practices is a slower and structurally conditioned process than simply updating knowledge.

Cluster 3

Channels of information circulation in neuromyths

neuroeducational literature shifts the question from how much educational stakeholders believe in neuromyths to *why* and *through what* channels these beliefs circulate, take root, and persist. The studies grouped in this cluster share a common concern: identifying the formal and informal, institutional and diffuse, individual and systemic sources that fuel and sustain misconceptions about the brain among various actors in the educational ecosystem. The convergence of their findings allows for the construction of a map of neuromyth circulation that goes beyond simply diagnosing prevalence to delve into the social and interactional dimensions of the phenomenon.

The contribution of Sazaka et al. (2024), who worked in Brazil with 157 participants—practicing teachers, student teachers, and the general public—posed a question that had been little explored in the Latin American context until then: not only what neuromyths are believed, but also where they were learned. They identified with relative precision the origin of each misconception, pointing to social media, teaching materials, peer interactions, and, particularly disturbingly, teacher training workshops as sources. These workshops present themselves as being based on learning science but, in practice, function as vectors of institutionalized transmission. This traceability of sources has direct strategic value for the design of interventions: if the origin of the myth is identifiable, it is possible to act on the specific channel instead of simply correcting established beliefs. The finding also confirms that approximately 30% of the teachers in the sample reported applying strategies based on these erroneous beliefs in their daily practice, and that this proportion remained stable across all groups, indicating that neither professional status nor accumulated experience act on their own as critical filters capable of interrupting the translation of neuromyths into the classroom.

The question of sources takes on a deeper institutional dimension when examining the role of university education as a channel for circulation. Sarmiento-Peralta et al. (2024), in the only cluster study focused on university students rather than practicing teachers, worked with 505 students from public and private universities in Peru and found statistically significant differences in the endorsement of neuromyths according to the type of university, urban or rural geographic origin, and gender. This adds a structural dimension to the analysis: neuromyths do not circulate homogeneously in social space, but rather their distribution is conditioned by the inequalities that permeate the educational system. This is consistent with the findings documented by Zhang et al. (2019, as cited in Sarmiento-Peralta et al., 2024) and replicated in the Colombian context by Ávila-Toscano et al. (2022), general neuroscience knowledge showed no significant relationship with belief in neuromyths ($p = .412$), reinforcing the thesis that mere exposure to the field does not guarantee critical thinking about its claims. But the most relevant contribution of this study to the cluster lies in its interpretive framework: articulating the problem from the perspective of University Social Responsibility (USR), the authors

point out that the proliferation of neuromyths among university students is not only an individual cognitive error, but a systemic failure of higher education institutions, which have an ethical obligation to guarantee the quality of the knowledge circulating within them. From this perspective, correcting neuromyths ceases to be a matter of specific training and becomes a question of institutional educational policy. This finding connects directly with the work documented by Voulgari et al. (2025) in Greece, where undergraduate university training and professional development programs together constituted 39% of the reported sources of neuromyths among primary school teachers (n = 82), and where the comparison between surveys from 2015 and 2024 revealed an increase, not a reduction, in the prevalence of all measured neuromyths , evidence that the expansion of training provision has not been accompanied by improvements in its epistemological quality.

A complementary line of findings concerns the paradox of formal sources at the individual level. Contrary to the intuition that access to scientific literature protects against neuromyths , Csányi et al. (2025), in the first large-scale study of practicing Hungarian teachers (n = 734), found that reading scientific publications was paradoxically associated with a higher rate of endorsement , a result the authors attribute to a mechanism of selective confirmation: readers without specialized critical training tend to retain those fragments of literature that confirm pre-existing beliefs. Similarly, Ávila-Toscano et al. (2022) found that the only significant predictors of neuromyth reduction in Colombian teachers (n = 308) were the regular reading of indexed journals and the presence of neuroscience courses in undergraduate training, not the general educational level or postgraduate continuing education, suggesting that it is not the quantity but the epistemological quality of exposure that determines the protective effect. Adding to this individual paradox is the role of professional experience as a channel for self-validation: Voulgari et al. (2025) documented that 85.4% of teachers who believed in the learning styles myth attributed that belief to their own professional experience, while Ávila-Toscano et al. (2022) confirmed that age, a variable directly associated with accumulated experience, was the strongest predictor of neuromyth endorsement in their Colombian sample. The emerging circuit is one of self-validation: the teacher learns a neuromyth during initial training, applies it in the classroom, interprets student results as confirmation of its effectiveness, and consolidates the belief with the authority of lived experience, making it especially resistant to correction because its source is no longer external but rather the teacher's own practice, now transformed into evidence.

The context of circulation also varies according to the actors and the social space in which they operate. Alkış Küçükaydın (2026), in the first study of neuromyths focused on families rather than teachers, documented among 206 Turkish parents of primary school students that social media (40.24%) and television news programs were the most frequently cited sources, with an average endorsement rate of 50.80%. The circulation profile here is predominantly media-driven and informal, and it is significant that the parents' level of education was inversely associated with belief in neuromyths , while enthusiasm for neuroscience paradoxically made them more vulnerable to the appeal of pseudoscientific explanations with a rigorous appearance. The study adds the family dimension to the cluster as a space for the reproduction of neuromyths beyond the school environment, extending the analysis to societal circulation.

The shift in focus from teachers to their educators finds its most systematic theoretical formulation in Racionero-Plaza et al. (2023), who, from the framework of socioneuroscience, introduce a conceptual distinction with far-reaching implications for the field: the difference between *neuromyths* and *neuroedumits* . While neuromyths are falsehoods about the brain transmitted by educators without neuroscientific knowledge, neuroedumits use real neuroscientific concepts but draw educational conclusions from them that are not empirically supported, and are transmitted by neuroscientists without sufficient pedagogical training. The four neuroedumits identified using the PLDA

methodology with 12 participants—that the brain needs to be bored to develop, that violence resides in male genes, that the brain develops almost completely in the first three years of life, and that there are right-brain and left-brain learners—circulate through public lectures and high-profile scientific dissemination, which confers upon them a qualitatively different epistemic authority than that of neuromyths transmitted through informal sources: they are backed by genuine disciplinary credentials in neuroscience, are perceived by teachers as more legitimate than the pedagogical literature itself, and are therefore more difficult to challenge. The epistemic shift introduced by this article is fundamental: the problem lies not only in the ignorance or lack of training of teachers, but also in the errors of those who train them. This reorientation connects directly with the training workshops identified by Sazaka et al. (2024) as vectors of neuromyths , and with the professional development programs documented by Voulgari et al. (2025) as the second most frequent source, adding the responsibility of the neuroscientific side of the circuit, not only the educational one, as an explanatory variable that has been under-addressed in the literature until now.

Finally, the cluster documents the emergence of a novel channel of circulation: artificial intelligence language models. Richter et al. (2025), in an experimental study with ChatGPT , Gemini, and DeepSeek , found that LLMs correctly identified around 80% of neuromyths when presented as direct statements, surpassing the average performance of teachers documented in the literature. However, when neuromyths were embedded in teacher-type questions such as "What materials can I use for my visual learners?", all the evaluated models reinforced the myth instead of correcting it. The authors attribute this behavior to the sycophantic tendency of LLMs : designed to meet user expectations, the models implicitly validate the assumptions of the question even if these are scientifically incorrect. The identified solution— explicit corrective prompting —shifts the responsibility to the teacher's AI literacy, making the ability to formulate questions a necessary skill to prevent the tool from operating as an amplifier of neuroscience misinformation. This finding completes the cluster 's circulation map with an emerging vector that combines the scale of digital media with the appearance of epistemic authority characteristic of specialized sources.

The combined examination of the studies included in this cluster allows us to formulate a conclusion of theoretical scope: neuromyths do not propagate as individual cognitive errors correctable through information, but rather as socially anchored beliefs that circulate through circuits of institutional, experiential, media, and, emergingly, algorithmic legitimation. University education that transmits myths, professional development programs that reinforce them, neuroscientists who extrapolate findings to the educational field without pedagogical competence, social networks that amplify them, and LLMs that validate them when questioned from the wrong premise share a common trait: in each case, the neuromyth circulates under the protection of some form of academic, experiential, media, or technological authority that makes it difficult to challenge from within the very system that produces it. Intervening on this systemic logic requires equally systemic responses: it is not enough to correct beliefs at the declarative level, nor to increase the amount of neuroscientific training available, but it is necessary to act on the epistemological quality of the institutional, professional and digital channels through which knowledge about the brain reaches those who educate.

Table 6

Research agenda and trends

Cluster	Trend priority	Topic for the future research agenda	References that support it
Neuroscience	Conceptual consolidation and epistemological refinement of the field	Development and validation of differentiated instruments to measure neuromyths and neuroedumits , integrating factor analysis and cross-cultural tests that distinguish conceptual error, poor pedagogical application and neuroscientific overextension .	Racionero-Plaza et al. (2023); Balmaseda-Serrano et al. (2025); Csányi et al. (2025)
Neuroscience	Mechanisms cognitive persistence	Experimental analysis of the cognitive processes that explain the resistance to the correction of neuromyths (epistemic overconfidence , selective confirmation, halo effect of neuroscientific terminology).	Pnevmatikos (2025); Sisman et al. (2025); Ávila-Toscano et al. (2022)
Education	Initial teacher training as the structural core of the problem	Audit and curricular redesign of teacher training programs (especially in early childhood and primary education) to eliminate the institutionalized transmission of neuromyths and strengthen evidence-based neuroscience literacy.	Adiguzel et al. (2025); Voulgari et al. (2025); Casillas-Martín & Cabezas-González (2024); Rodríguez-Fuentes et al. (2025)
Education	Conceptual correction interventions	Comparative evaluation of 'active unlearning' strategies and explicit refutation versus traditional information models in the sustained reduction of neuromyths in practicing teachers.	Wauthia et al. (2026); Fernandez et al. (2025); Khramova et al. (2023)
Traffic channels	Formal institutions and professional socialization as primary vectors	Cartografía multicanal de la circulación institucional de neuromitos (universidad, desarrollo profesional, pares académicos) mediante diseños longitudinales que rastreen la cadena fuente → creencia → práctica.	Sazaka et al. (2024); Voulgari et al. (2025); Balmaseda-Serrano et al. (2025)
Traffic channels	Emerging digital channels and algorithmic authority	Evaluation of the sycophantic behavior of language models (LLMs) in applied educational contexts and design of AI literacy protocols to prevent the automatic validation of neuromyths .	Richter et al. (2025); Alkış Küçükaydın (2026)

Note: Prepared by the author based on the bibliometric analysis of the three clusters.

The future research agenda proposed in this study is structured around six thematic lines derived from the convergent analysis of three bibliometric clusters: neuroscience, education, and channels of circulation of neuromyths . The selection of these lines is based on a criterion of cumulative relevance: each theme contains repeated research recommendations in multiple independent studies, indicating not only that the problem persists, but also that the scientific community explicitly recognizes its unresolved nature.

From the neuroscience cluster, the agenda prioritizes two complementary lines of action. The first addresses the need to conceptually refine the field by developing distinct instruments that allow us to differentiate between neuromyths (falsehoods about the brain) and neuroedumits (incorrect pedagogical applications of real neuroscientific findings) (Racionero-Plaza et al., 2023; Balmaseda-Serrano et al., 2025). This distinction, absent in most available measurement instruments, is a necessary condition for designing relevant corrective interventions. The second line of action addresses the cognitive mechanisms of persistence: accumulated evidence shows that the problem lies not only in misinformation, but also in processes such as epistemic overconfidence and the selective assimilation of neuroscientific terminology, which immunizes erroneous beliefs against direct refutation (Pnevmatikos , 2025; Sisman et al., 2025).

From the education cluster perspective, the agenda identifies initial teacher training as the structural core of the problem. Multiple studies from diverse contexts such as Greece, Ecuador, Spain, and Colombia (Adiguzel et al., 2025; Voulgari et al., 2025; Casillas-Martín & Cabezas-González, 2024; Rodríguez-Fuentes et al., 2025) concur that university teacher training programs themselves act as primary vectors for the institutionalized transmission of neuromyths , making curriculum auditing and redesign an urgent priority. Additionally, the available evidence on corrective interventions indicates that explicit refutation and active unlearning strategies are more effective than purely informational models (Wauthia et al., 2026; Fernández et al., 2025), although their longitudinal evaluation remains a pending issue in the field.

Finally, the cluster on circulation channels provides a systemic dimension that transcends individual diagnosis: neuromyths persist not only due to personal beliefs but also because they are embedded in institutional circuits—universities, professional development programs, academic peers, and emerging digital channels (Sazaka et al., 2024; Voulgari et al., 2025; Balmaseda-Serrano et al., 2025). The emergence of artificial intelligence language models as new circulation nodes with documented sycophantic behavior that reinforces the neuromyth implicit in the user's question represents the most recent frontier of the field (Richter et al., 2025; Alkış Küçükaydın , 2026). Taken together, the proposed agenda articulates epistemological, formative, and systemic needs whose integrated attention is a prerequisite for neuroeducation to move from diagnosis toward the transformation of evidence-based educational practices.

Conclusions

This bibliometric analysis maps a rapidly consolidating field: scientific production on neuromyths in education grew by 70% between 2022 and 2025, with the debate concentrated in the journal *Trends in Neuroscience and Education* and a hegemony of European and North American contexts that contrasts with the persistent underrepresentation of Latin America. The most relevant theoretical finding is the explanatory shift that the three identified clusters—Neuroscience, Education, and Channels of Circulation—impose on conventional interpretations: neuromyths are not individual errors correctable through information, but rather products of institutional, professional, and digital

circuits that legitimize and reproduce them. This explains why conventional training interventions have limited effects and why teacher training programs themselves can act as vectors of transmission. The emergence of artificial intelligence language models as new channels for the algorithmic circulation of neuromyths constitutes the most urgent frontier of the field and demands the incorporation of critical AI literacy into teacher training. The limitations of the study—restriction to Scopus , Anglophone bias, and limited time window—open an agenda for future research that broadens the Latin American perspective, validates instruments differentiated by cultural context, and longitudinally evaluates interventions based on explicit refutation and active unlearning.

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