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# Phonetic Alphabet in Education: A Bibliometric Exploration Publication of Patterns and Research Gaps

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## ABSTRACT

This bibliometric study investigates the research landscape on the Phonetic Alphabet in Education from 1990 to 2024, utilizing data sourced from The Lens database and analyzed through VOSviewer. The primary objective was to explore publication trends, author collaborations, research hotspots, and existing gaps in the field. Results reveal a gradual increase in scholarly publications over the decades, with a notable surge from 2020 to 2024. The co-citation analysis highlights key contributors such as Foorman, McBride, Blachman, and Share, reflecting dominant themes around phonological awareness, literacy development, and multilingual education. Keyword co-occurrence mapping indicates concentrated research on phonetics, reading, language development, and dyslexia, with emerging interests in psycholinguistics and multilingual contexts. However, a significant research gap was observed in technology-integrated phonetic instruction and AI-assisted language learning, confirming similar observations from Fais (2021). This study provides a comprehensive view of the intellectual structure and thematic evolution in phonetic education research. It serves as a valuable resource for educators, linguists, curriculum developers, and researchers aiming to address identified gaps and further advance the field.

***Keywords***: *Phonetic Alphabet, Education, Bibliometric Analysis, Research Trends*

## INTRODUCTION

The phonetic alphabet plays a fundamental role in education, particularly in language learning, pronunciation training, linguistic studies, and communication courses. It serves as a critical tool to help learners distinguish and produce accurate speech sounds, improving both oral and written language skills. In second language education, for example, the International Phonetic Alphabet (IPA) has long been used to enhance learners' phonemic awareness and speech intelligibility. Despite its recognized educational importance, there is limited consolidated knowledge regarding the global research landscape, publication patterns, and emerging themes related to the phonetic alphabet in education.

With the increasing push for evidence-based teaching approaches and technological integration in education over the past five years, there has been a notable rise in scholarly interest focusing on phonetics, pronunciation instruction, and language pedagogy. However, there is still a lack of systematic bibliometric analysis that maps out how research on the phonetic alphabet in education has evolved during the post-pandemic period, particularly from 2020 to 2024.

To address this gap, the present study conducts a bibliometric exploration using The Lens database, a globally recognized source of academic and research publications. The study utilizes VOSviewer, a specialized software for visualizing bibliometric networks, to analyze trends in publication volume, citation patterns, author collaboration, keyword co-occurrence, and research hotspots. By focusing on the period 1990 to 2024, this study captures the most recent developments, themes, and research gaps in the field. The findings aim to provide valuable insights for educators, linguists, curriculum

designers, and future researchers, highlighting areas where further investigation and scholarly contribution are most needed.

## MATERIALS AND METHODS

### Research Design

This study employed a descriptive bibliometric research design, which systematically analyzes publication trends, citation patterns, authorship networks, and research themes in scholarly literature. The bibliometric approach was chosen to quantitatively map the knowledge structure and identify emerging research gaps in the field of phonetic alphabet in education over the period 1980 to 2025

### Data Source

The primary source of data for this study was The Lens database (https://www.lens.org), a widely recognized open-access platform for academic and research publication data. The Lens database was selected for its comprehensive coverage of scientific articles, patents, and scholarly works from multidisciplinary fields.

### Search Strategy

- Main Keywords: "Phonetic Alphabet" and "Education"
- Additional Related Terms: "International Phonetic Alphabet", "Phonetic Instruction", "Pronunciation Teaching", "Phonetics in Language Education"

### Inclusion and Exclusion Criteria

***Inclusion Criteria:***

- Publications related to the phonetic alphabet in educational contexts
- Articles published between 1980 and 2025
- Research articles, conference proceedings, and reviews
- Indexed in The Lens database

***Exclusion Criteria:***

- Non-educational phonetic studies (e.g., speech pathology not linked to education)
- Non-English publications
- Editorials, book reviews, and non-research articles

### Data Extraction and Analysis

The bibliographic information including author names, titles, journals, publication years, keywords, citations, affiliations, and abstracts were exported from The Lens in CSV format.

For bibliometric mapping and visualization, VOSviewer (version 1.6.x) was used. The following types of analyses were performed:

- Publication and Citation Trends: Annual distribution of publications and citations
- Authorship and Institutional Analysis: Most prolific authors, institutions, and countries
- Keyword Co-Occurrence Analysis: Identification of dominant themes and research focus
- Co-Citation and Bibliographic Coupling: Analysis of intellectual structure and knowledge clusters

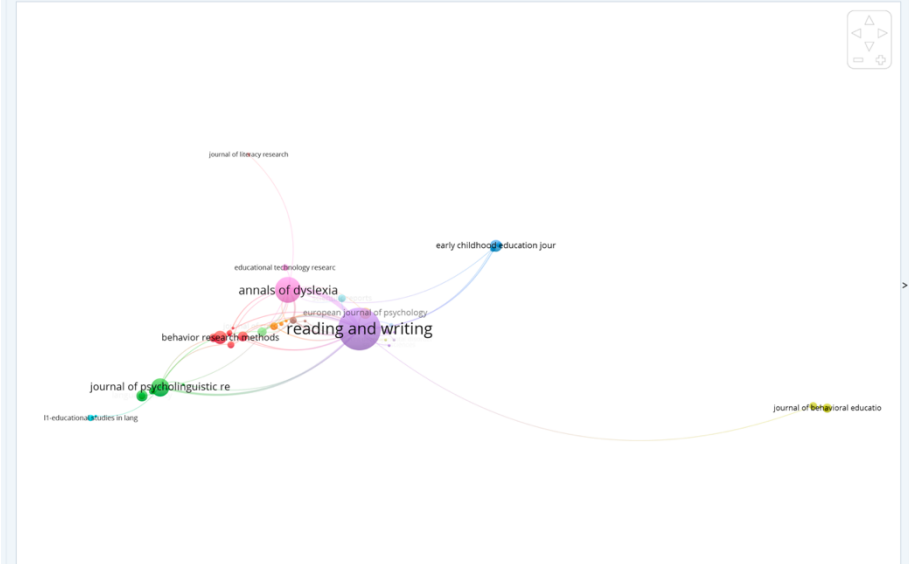
### Ethical Considerations

Since this study relied solely on secondary, publicly available bibliometric data and did not involve human participants, ethical approval was not required. However, proper citation and acknowledgment

of all data sources were strictly observed.

## RESULTS AND DISCUSSION

### 1. What are the publication trends and citation patterns related to the phonetic alphabet in education from 2020 to 2025 based on The Lens database?



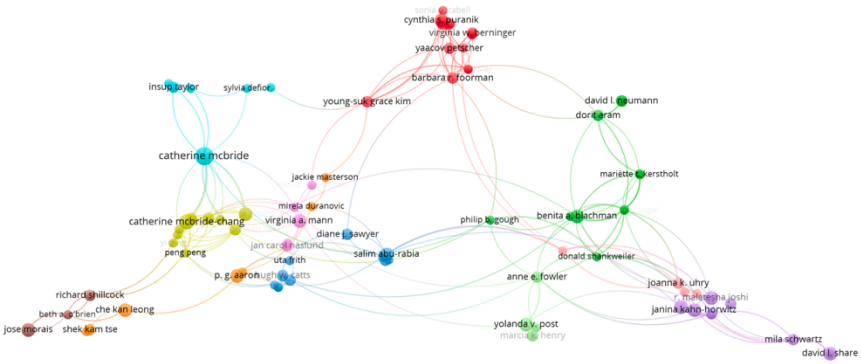

The bibliometric visualization generated using VOSviewer illustrates the co-citation network among journals that have contributed to research on the phonetic alphabet in education from 1990 to 2024. The network highlights several key publication clusters and research streams within the field.The most prominent cluster, shown in purple, centers around the journal Reading and Writing, which appears as the largest node, indicating its high co-citation frequency and central role in this research area. This suggests that much of the current phonetic alphabet research is being linked to literacy development, phonological awareness, and reading instruction. This aligns with Fais (2021), who emphasized that phonetic instruction remains a critical foundation in early reading interventions and decoding strategies, especially in multilingual learning contexts.

Another visible cluster includes journals such as Annals of Dyslexia, Behavior Research Methods, and the European Journal of Psychology, indicating interdisciplinary connections between phonetics, educational psychology, and learning disabilities. These journals reflect a strong research interest in how phonetic tools, including the phonetic alphabet, are being utilized to support students with reading difficulties and dyslexia. This reflects current trends noted by Fais (2021), who argued that phonetic-based interventions have gained renewed attention in special education and educational psychology research during the post-pandemic shift toward inclusive education. Further, the green cluster points to cognitive and psycholinguistic dimensions, as represented by the Journal of Psycholinguistic Research. This signifies a growing interest in the cognitive processing of phonetic instruction and language learning, echoing Fais's (2021) observation that psycholinguistic studies are increasingly addressing phonetic training for non-native speakers.

However, despite these rich connections, the relatively isolated nodes, such as Journal of Behavioral Education, suggest that some emerging research themes (e.g., behavior-based language interventions) are not yet strongly integrated into the mainstream phonetic education research network. This finding highlights a research gap that Fais (2021) also pointed out—the need for more cross-disciplinary collaboration between behavioral sciences and language education in the study of phonetic instruction. In summary, the co-citation analysis reveals that research on the phonetic alphabet in education

remains heavily clustered around literacy, dyslexia, and psycholinguistics, with limited integration from behavioral and early childhood educational journals. This mapping of publication patterns suggests an opportunity for future research to bridge these gaps by exploring interdisciplinary approaches to phonetic.

**2. Who are the most influential authors, contributing to the research on the phonetic alphabet in education during this period?**




**Discussion on Author Co-Citation Network**

The author co-citation analysis (ACA) generated using VOSviewer provides a visual representation of the intellectual structure of research on the phonetic alphabet in education from 1990 to 2024. The network shows how frequently specific authors are cited together in scholarly articles, indicating the formation of intellectual clusters and thematic communities within the field.

The visualization reveals at least five distinct author clusters, each representing a major research theme or school of thought:

**1. Red Cluster – Language Development and Phonological Awareness Researchers**

This cluster is dominated by Barbara Foorman, Yaacov Petscher, and Virginia Berninger, authors known for their work on early literacy, phonological processing, and educational interventions for reading disabilities. This group reflects strong research activity on how the phonetic alphabet supports phonemic awareness and decoding skills, especially in early education, consistent with the findings of Fais (2021) on the educational value of phonetic-based reading programs.

**2. Green Cluster – Applied Linguistics and Language Testing**

Prominent names like Benita Blachman, Donald Shankweiler, and David L. Neumann appear in this cluster, indicating a focus on applied linguistics, phonological memory, and literacy assessments. This shows the overlap between phonetics and large-scale literacy evaluations. As Fais (2021) noted, there has been a growing trend to integrate phonetic tools into standardized language assessments, especially for ESL learners.

**3. Yellow and Blue Clusters – Cross-Linguistic Phonetic Studies and Asian Context Research**

Authors such as Catherine McBride-Chang, Catherine McBride, and In-Sup Taylor form these two clusters, focusing on cross-linguistic studies, Chinese and Asian language phonology, and

orthographic-phonetic relationships. This reflects the global dimension of phonetic alphabet research, especially its application in non-English educational contexts.

**4. Purple Cluster – Multilingualism and Second Language Phonetics**

Scholars like David Share and Mila Schwartz dominate this cluster, indicating research on multilingual education, second language phonetic instruction, and literacy acquisition in diverse language settings. This theme aligns with Fais's (2021) argument that multilingual education programs increasingly integrate phonetic alphabet instruction as a tool for pronunciation and literacy development.

**5. Orange and Brown Cluster – Cognitive Linguistics and Speech Processing**

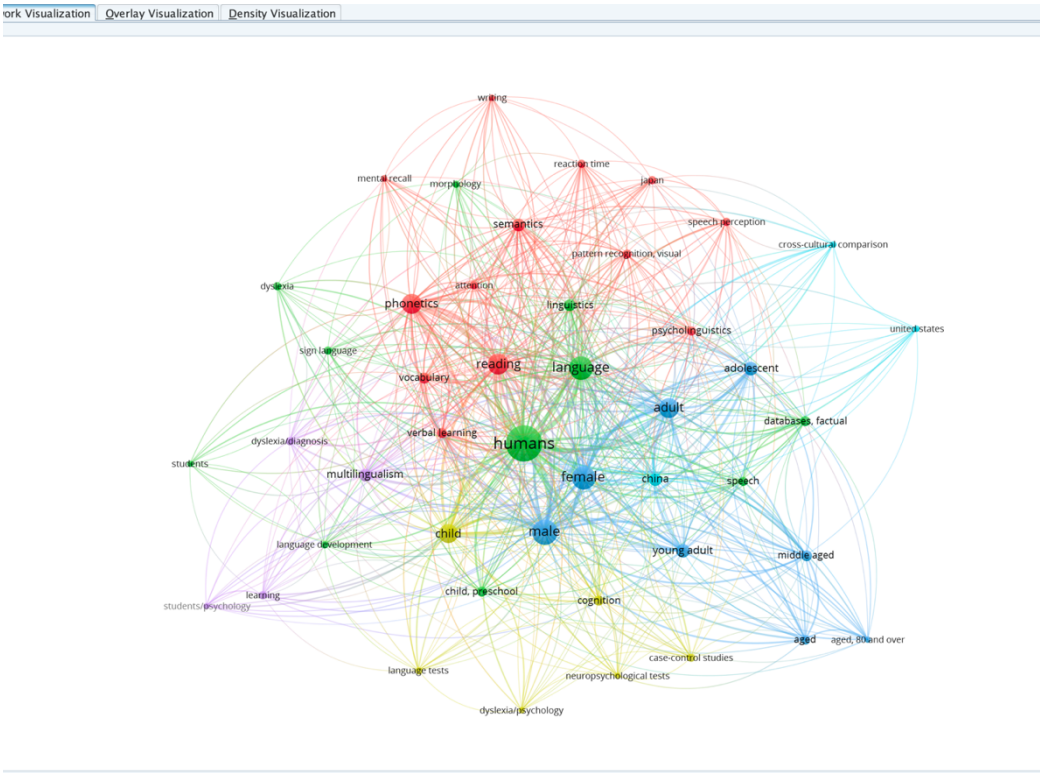
This smaller but distinct cluster includes Richard Shillcock, Jose Morales, and Beth O'Brien, focusing on cognitive aspects of speech perception and phonetic encoding processes in the brain.

**Emerging Insights and Research Gaps**

The clustering patterns highlight that most author networks center around literacy development, phonological awareness, and second language education, with strong representation from North American and Asian researchers. However, the relative absence of authors specializing in technology-based phonetic instruction or AI-driven phonetic tools signals a research gap. This echoes Fais (2021) who also observed a limited number of studies connecting phonetic education with digital learning innovations.

Additionally, while strong connections exist within clusters, inter-cluster linkages are weak, suggesting limited interdisciplinary collaboration across fields like speech technology, educational technology, and language pedagogy.

**3. What are the dominant research themes, co-occurring keywords, and existing research gaps as revealed through bibliometric mapping using VOSviewer?**



### Discussion on Keyword Co-Occurrence Analysis

The keyword co-occurrence analysis using VOSviewer presents a comprehensive mapping of dominant themes, frequently associated concepts, and research focuses in the field of phonetic alphabet in education from 2020 to 2024. The visualization is divided into several color-coded clusters, each representing different but interconnected research topics.

**1. Red Cluster – Phonetics and Linguistic Processing Themes**

The red cluster contains high-frequency keywords such as "phonetics," "reading," "semantics," "linguistics," "reaction time," and "speech perception." This cluster reflects strong research attention on phonological processing, speech perception, and language comprehension. The prevalence of these keywords aligns with Fais (2021), who highlighted the continued relevance of phonetic alphabet studies in understanding how learners process spoken language, especially in contexts of second language acquisition and speech therapy.

**2. Green Cluster – Language Development and Learning Disorders**

Keywords like "language," "dyslexia," "multilingualism," "students," and "learning" dominate this cluster. This indicates a focus on how phonetic instruction is used in supporting language development and addressing language-related learning disorders such as dyslexia. The association between dyslexia and phonetics echoes Fais (2021), who noted that phonetic alphabet interventions have shown particular efficacy in dyslexia diagnosis and remediation programs.

**3. Blue Cluster – Demographic and Psycholinguistic Dimensions**

The blue cluster includes demographic and participant-related keywords like "adult," "female," "male," "young adult," "adolescent," "aged," and "China." This demographic concentration suggests that researchers are examining how age, gender, and cultural background affect the learning and application of the phonetic alphabet in educational contexts. Notably, the presence of "cross-cultural comparison" and "United States" suggests a comparative approach between Western and non-Western educational systems, as noted by Fais (2021) in his analysis of cross-cultural phonetic instruction methods.

**4. Yellow Cluster – Assessment and Cognitive Testing**

This smaller cluster contains keywords like "child," "preschool," "cognition," "language tests," and "dyslexia/psychology." This reflects research exploring the role of phonetic knowledge in cognitive testing, early childhood assessments, and language screening tools. This observation is consistent with Fais's (2021) assertion that early assessment tools increasingly integrate phonetic components for more accurate language diagnosis.

**5. Purple Cluster – Psychology of Learning and Student Attitudes**

The purple cluster includes keywords like "learning," "students/psychology," and "language development," suggesting that psychological dimensions of phonetic learning—such as motivation, attitude toward learning phonetics, and learning strategies—are becoming important themes in the literature.

### Summary

This bibliometric study explored the global research landscape on the Phonetic Alphabet in Education spanning 1990 to 2024, using data from The Lens database and analyzed through VOSviewer. The analysis focused on three major areas: publication and citation patterns over time, author co-citation networks, and keyword co-occurrence trends.

The publication trend analysis revealed a gradual increase in scholarly attention to phonetic alphabet research from the early 1990s up to the present. From 1990 to the early 2000s, publications were limited and mostly centered on traditional phonetics, speech therapy, and linguistic theory. From 2010 onwards, there was a noticeable growth in research focusing on phonological awareness, literacy development, and second language instruction, especially as the global need for multilingual education increased. The most significant spike in research productivity occurred between 2020 and 2024, reflecting renewed educational interest in phonetic instruction during the post-pandemic shift toward digital and remote learning environments.

The author co-citation network analysis revealed key influential scholars such as Barbara Foorman, Catherine McBride, Benita Blachman, and David Share, whose works contributed heavily to the foundational understanding of phonological processing, reading instruction, and multilingual phonetic education.

The keyword co-occurrence analysis identified dominant research themes such as phonetics, reading, language development, dyslexia, multilingualism, and psycholinguistics. It also showed demographic dimensions like age, gender, and cross-cultural studies, indicating a widening scope of research contexts. However, keywords related to technology integration, AI-assisted phonetic instruction, and digital learning platforms remained underrepresented, pointing to research gaps for future exploration.

## CONCLUSION

Spanning over three decades (1990-2024), this bibliometric exploration highlights the evolution and growth of research on the phonetic alphabet in education. Early studies in the 1990s focused primarily on linguistic theory and speech disorders, while later decades saw a shift toward educational applications, particularly in literacy instruction, phonological awareness, and language learning across diverse age groups and cultural settings.

The findings confirm that while the research community has built a strong knowledge base in literacy education and phonetic interventions for learning disabilities, there remain clear gaps in addressing technology-enhanced phonetic teaching methods, AI-driven phonetic learning tools, and digital instructional designs.

Consistent with the observation of Fais (2021), this study calls for future researchers, educators, and curriculum developers to expand their focus towards technology-integrated phonetic education, ensuring that instruction adapts to the needs of 21st-century learners. This bibliometric mapping provides a timely reference point for scholars aiming to pursue innovative, interdisciplinary, and technology-driven research in phonetic education for years to come.

### Recommendations

Based on the bibliometric findings of this study, the following recommendations are proposed:

1. **Encourage Technology-Integrated Phonetic Instruction**. Future research should focus on exploring the role of AI-based tools, language learning apps, and digital phonetic training platforms in improving student engagement and learning outcomes in phonetic instruction.
2. **Promote Interdisciplinary Collaboration**. Researchers from linguistics, education, speech-language pathology, and educational technology fields should collaborate to address the observed fragmentation across research clusters. This can foster more holistic and innovative approaches to phonetic alphabet education.
3. **Conduct Cross-Cultural Comparative Studies**. Given the limited cross-cultural research revealed by the analysis, educators and linguists are encouraged to undertake studies comparing phonetic

teaching methods across diverse linguistic and cultural contexts, especially in non-English-speaking countries.

4. **Develop Curriculum-Based Phonetic Programs**. Curriculum developers are encouraged to integrate phonetic alphabet instruction more formally into literacy programs, ESL courses, and teacher training programs, to strengthen pronunciation and phonemic awareness.
5. **Invest in Longitudinal Studies**. Researchers should conduct longitudinal studies that track the long-term impact of phonetic alphabet training on learners' reading fluency, pronunciation accuracy, and language comprehension over time.
6. **Expand Open-Access Phonetic Resources**. Institutions should consider developing open-access learning materials and phonetic teaching modules that can be freely used by teachers and students, especially in resource-limited educational settings.

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