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SCOPUS-BASED BIBLIOMETRIC ANALYSIS OF MULTILINGUAL TEACHER EDUCATION

Abstract

In recent years, multilingual teacher education has garnered substantial attention. We embarked on a comprehensive bibliometric analysis spanning 16 years (2007-2023) to illuminate this evolving field. Employing Scopus database and Boolean operators, we conducted searches in English, using the Bibliometrix package in RStudio and Biblioshiny web apps for analysis. Our investigation unveiled consistent publication and citation growth over the past 16 years, with an upsurge observed in 2022. A standout among the top cited documents was Airey's 2012 paper, amassing 196 citations. Lo YY emerged as the most prolific author, contributing ten papers to the field. Notably, the "International Journal of Bilingual Education and Bilingualism" held a central role as the primary journal. The University of Jyväskylä made substantial contributions, solidifying its position as a leading institution. Spain, China, and the UK were the most active countries, showcasing their commitment to multilingual teacher education research. Our analysis highlighted the significance of researchers forging collaborations with established authors and institutions. Identifying research hotspots and gaps within this burgeoning field is paramount, guiding future research endeavors. This bibliometric analysis provides a roadmap for researchers seeking to contribute meaningfully to the dynamic realm of multilingual teacher education. By capitalizing on established partnerships and recognizing key areas of interest, researchers can navigate this domain effectively, driving progress and innovation.

Keywords: multilingualism, education, teacher, bibliometric, research.

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SCOPUS НЕГІЗІНДЕГІ КӨПТІЛДІ ПЕДАГОГИКАЛЫҚ БІЛІМ БЕРУГЕ БИБЛИОМЕТРИЯЛЫҚ ТАЛДАУ ЖАСАУ

Аңдатпа

Соңғы жылдары көптілді педагогикалық білім беруге көп көңіл бөлініп жатыр. Мен осы дамып келе жатқан көптілді педагогикалық білім беру бойынша 16 жылды (2007-2023) қамтитын жан-жақты библиометриялық талдау жасадым. RStudio және biblioshiny веб-қосымшаларындағы bibliometrix пакетін қолдана отырып, Scopus базасындағы ағылшын тілінде жарық көрген көптілді педагогикалық білім беру бойынша зерттеулерге библиометрикалық талдау жасадым. Зерттеудің нәтижесінде, соңғы 16 жыл ішінде көптілді педагогикалық білім беру бойынша басылымдар мен дәйексөздердің тұрақты өсуі анықталды, әсіресе 2022 жылы өсім байқалды. Ғылыми зерттеулердің ішінде Эйридің 2012 жылғы мақаласы 196 дәйексөз жинағаны және Луо Ю осы салада он мақала жариялап, көптілді педагогикалық білім беру бойынша көп үлес қосқандығы анықталды. Сонымен қатар, "Халықаралық екі тілді білім беру және екі тілділік журналы" осы зерттеу тақырыбы бойынша көп баслымдар жарияланғаны анықталды. Ювяскяла университеті жетекші оқу орны ретіндегі позициясын нығайта отырып, айтарлықтай үлес қосты. Испания, Қытай және Ұлыбритания көптілді педагогикалық білім беру саласындағы зерттеулерге үлес қосқан ең белсенді елдер болды. Библиометриялық талдау барысында зерттеушілердің белгілі авторлармен және әр түрлі институттармен ынтымақтастығының маңыздылығын атап өтілді. Бұл библиометриялық талдау көптілді педагогикалық білім берудің динамикалық саласына елеулі үлес қосқысы келетін зерттеушілер үшін жол картасын ұсынады және өз зерттеулеріне қолдана алады.

Түйін сөздер: көптілділік, білім, мұғалім, библиометрия, зерттеу.

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БИБЛИОМЕТРИЧЕСКИЙ АНАЛИЗ МНОГОЯЗЫЧНОГО ПЕДАГОГИЧЕСКОГО ОБРАЗОВАНИЯ НА ОСНОВЕ SCOPUS

Аннотация

В последние годы многоязычному педагогическому образованию уделяется значительное внимание. Я приступила к всестороннему библиометрическому анализу, охватывающему 16 лет (2007-2023), чтобы осветить эту развивающуюся область. Используя базу данных Scopus и логические операторы, я провела поиск на английском языке, используя для анализа пакет Bibliometrix в RStudio и веб-приложения Biblioshiny. Наше исследование выявило постоянный рост публикаций и цитируемости за последние 16 лет, причем всплеск наблюдался в 2022 году. Среди наиболее цитируемых документов выделялась статья Эйри за 2012 год, собравшая 196 цитат. Лоу Ю стал самым плодовитым автором, опубликовав десять статей в этой области. Примечательно, что "Международный журнал двуязычного образования и билингвизма" занимал центральное место в качестве основного журнала. Университет Ювяскюля внес значительный вклад, укрепив свои позиции в качестве ведущего учебного заведения. Испания, Китай и Великобритания были наиболее активными странами, продемонстрировавшими свою приверженность исследованиям в области многоязычного педагогического образования. Мой анализ выявил важность сотрудничества исследователей с известными авторами и институтами. Выявление "горячих точек" и пробелов в этой развивающейся области имеет первостепенное значение, направляя будущие исследовательские усилия. Этот библиометрический анализ представляет собой дорожную карту для исследователей, стремящихся внести значимый вклад в динамичную сферу многоязычного педагогического образования. Используя сложившиеся партнерские отношения и признавая ключевые области интересов, исследователи могут эффективно ориентироваться в этой области, способствуя прогрессу и инновациям.

Ключевые слова: многоязычие, образование, учитель, библиометрия, научные исследования.

Introduction. The field of multilingual teacher education has gained increasing attention and importance in recent years, considering the growing linguistic diversity and globalization of our society. Multilingual teacher education encompasses the comprehensive training and preparation of educators capable of proficiently instructing and nurturing students from diverse linguistic backgrounds. These teachers are equipped with the requisite knowledge, skills, and attitudes to address the unique needs of multilingual learners, fostering their academic and linguistic achievements. A multilingual teacher must be equipped with a deep understanding of language acquisition, sociocultural factors, and pedagogical strategies that best support learners' language development. With the increased movement of people, goods, and information brought about through globalization, the world's classrooms are becoming more diverse in every way. It is difficult today to find a teacher in any part of the world who is not faced with a multilingual classroom (García & Kleyn, 2019). They should acknowledge and value the multiple languages and cultures⁵ in their classrooms. Furthermore, a multilingual teacher should identify the unique needs and challenges faced by bilingual or multilingual individuals, providing targeted and differentiated instruction to promote their language and academic growth. Effective multilingual teacher education programs focus on providing comprehensive coursework, field experiences, and professional development opportunities. These programs emphasize the development of language proficiency, cultural competence, and knowledge of bilingual and multilingual pedagogies. These practices encourage reflection, prompting educators to critically assess their beliefs, attitudes, and instructional methods concerning multilingual learners. The ultimate goal of multilingual teacher education is to equip teachers with the tools and strategies necessary to create inclusive and equitable learning environments that celebrate linguistic and cultural diversity. By equipping educators with the ability to adeptly instruct multilingual learners, we can contribute to closing the achievement disparity and securing academic success for every student, irrespective of their linguistic heritage. Multilingual teacher education is an essential component of creating a just and equitable education system that embraces and values the linguistic and cultural assets of all students.

Bibliometric analysis is an invaluable research methodology employed for comprehensive bibliometric mapping of published articles (Toyin & Mewomo, 2023). It serves as an established tool

for the objective assessment of global scientific productivity in specific fields or disciplines. This method encompasses both quantitative and qualitative evaluations of scholarly publications, shedding light on research trends, collaboration dynamics, citation impact, and other pertinent factors (Akyol & Kocyigit, 2021b; Jamshidi et al., 2012). Moreover, bibliometric analysis proves instrumental in discerning the most influential journals, drawing from publication and citation trends (Baumgartner & Pieters, 2003; Martínez-López et al., 2018). While various studies have applied bibliometric analysis in the field of education, encompassing areas such as teacher development (Feifei & Abdullah, 2023), digital storytelling in language education (Avcı & Kasımi, 2023), English language teaching, and EFL teacher personality competence (Nappu & Qalbi, 2023), multicultural education (Mahendra & Maftuh, 2023), postgraduate theses on bilingualism (Ermağan), and educational technology in bilingual education (Mubarok, 2023), the specific application of bibliometric analysis to guide the advancement of "Multilingual Teacher Education" research has remained unexplored. Therefore, the purpose of this bibliometric analysis is a comprehensive understanding of trends and progress in the results of global research on multilingual teacher education over the past 16 years, covering the period from 2007 to 2023.

Basic provisions. This article explores the significance and evolution of multilingual teacher education amid increasing global linguistic diversity. The authors highlight that multilingual teacher education aims to train educators who can effectively teach students from diverse linguistic backgrounds. These teachers need a robust understanding of language acquisition, sociocultural dynamics, and appropriate pedagogical strategies to support multilingual learners' academic and linguistic growth.

The article discusses the importance of multilingualism in Kazakhstan's educational policy, noting that interactive teaching methods enhance students' motivation to learn English. Teachers integrating various teaching techniques and modern educational technologies can significantly foster the intellectual development of children. The authors argue that intellectual training in English lessons not only aids in language learning but also promotes personal and intellectual growth among primary school students.

The study uses bibliometric analysis to map global research trends in multilingual teacher education from 2007 to 2023. It identifies prolific authors, influential articles, and key contributing institutions and countries. The analysis reveals a consistent increase in publications, with Spain leading in research output and collaboration. Notably, the article "I don't teach language": The linguistic attitudes of physics lecturers in Sweden by Airey (2012) is highlighted as the most cited work.

The authors conclude that bibliometric analysis is a valuable tool for understanding research trends and identifying future directions in multilingual teacher education. The findings emphasize the need for continuous collaboration and innovation in teaching practices to address the diverse needs of multilingual learners, ultimately contributing to an inclusive and equitable education system.

Materials and Methods.

Criteria for Eligibility and Data Sources

We reviewed research works on multilingual teacher education published in English language between 2007 and 2023 years in this bibliometric analysis. It included original articles, reviews and conference papers. We received data from the Scopus database, carefully collecting and systematizing comprehensive metadata in BibTeX format.

Search Strategy

A strategic approach was employed in the advanced search feature of the Scopus database, utilizing logical search operators and wildcard operators to query keywords like "multilingual," "teacher," and "education." This thorough search was conducted on August 29, 2023, with the detailed search methodology illustrated in Figure 1 for reference.

Bibliometric Analyses

In this research endeavor, we conducted data management and carried out bibliometric analyses using the Bibliometrix package (version 3.1.4) and Biblioshiny web applications. Key information and attributes of the included studies were systematically extracted. The investigation spanned a 16-year period, encompassing the development of publication and citation trends.

The research pinpointed institutions that stood out in terms of productivity, based on their substantial paper submissions between 2007 and 2023. To delve deeper into these institutions' collaborative efforts, a network was systematically established among the top five, utilizing the leading eigenvalues clustering algorithm. This comprehensive analysis involved 286 papers.

Moreover, this analysis revealed the authors who had the most significant impact, as evidenced by their extensive contribution to the work. It studied co-citation networks among these contributing authors based on the leading eigenvalue clustering algorithm with a repulsive force of 0.1. In addition, the study revealed the top ten highly-cited articles and journals with the highest performance. It extracted relevant attributes such as country of origin, publication volume, H-index, total citations, Journal Citation Report (JCR®), Web of Science (WoS) impact for 2020 Factor, journal category and quartile classification. To visually represent the dynamic interactions among the top ten journals, universities, and countries contributing to multilingual teacher education research over the past 16 years, we meticulously constructed a three-fields plot. Additionally, we created a Collaboration Worldmap to illustrate the global landscape of research collaboration, applying a minimum edge threshold of ten.

Results and discussion.

Search Results

Our initial search of the Scopus database revealed 485 articles. After carefully applying our selection criteria and excluding 199 studies that did not meet these criteria, we eventually selected 286 articles for inclusion in this extensive bibliometric analysis (Figure 1).

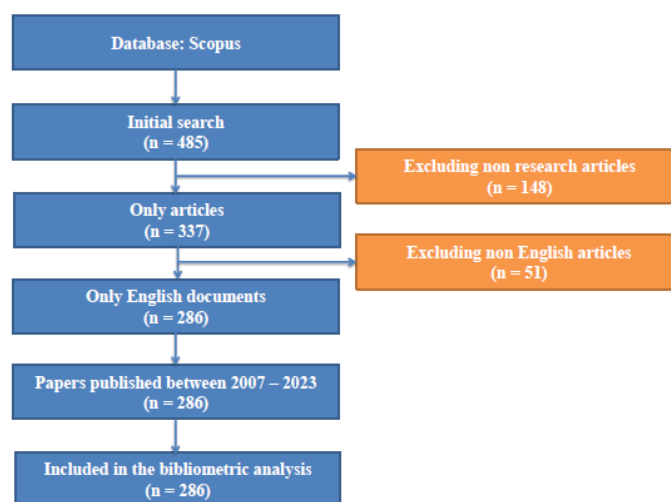


Figure 1. Study Selection Flowchart for Bibliometric Analysis

Major Characteristics of the Included Studies

Among the included studies, the majority was original articles (59%), and the rest included non-research and non-English-language articles (41%). Notably, the average citation count per document and per year stood at 13.13 and 2.5, respectively. Intriguingly, the average duration for an article to garner citations in this field amounted to 8.9 years.

Spain emerged as the most frequently cited country (with 961 citations), followed by Austria (with 299 citations) and Sweden (with 294 citations). Conversely, papers authored by Sweden scholars garnered the highest average citation per article, reaching 101.1.

Table 1 offers insights into the top 10 highly-cited articles in this field, with seven originating from original research. The analysis covered 286 studies, involving 506 individuals from 39 countries. On average, each author contributed to 0.5 documents, resulting in an average of 1.8 authors per article. Remarkably, only 29% of authors produced single-authored articles.

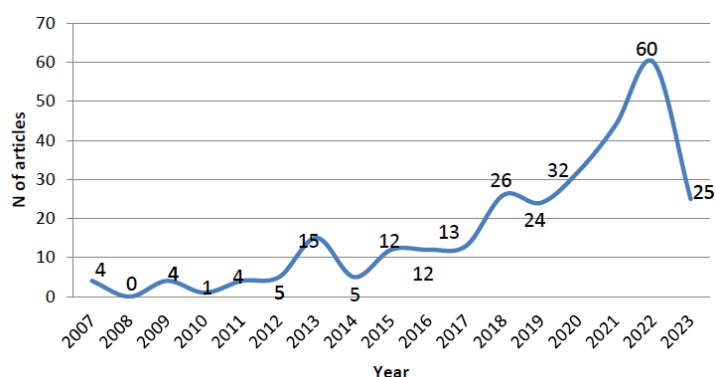
The majority of the published articles were categorized under the research fields of (i) CLIL (comprising 70% of the total), followed by (ii) education (at 45.8%), and (iii) teachers (at 38.6%).

Table 1. *The ten most frequently cited documents in the realm of multilingual teacher education research (2007-2023)*

Rank	Title of the Document	Journal name	Total citation
1	“I don’t teach language”: The linguistic attitudes of physics lecturers in Sweden (Airey, 2012)	AILA Review	196
2	English-medium masters’ programmes at an Austrian university of applied sciences: Attitudes, experiences and challenges (Tatzl, 2011)	Journal of English for Academic Purposes	134
3	A construct of cognitive discourse functions for conceptualising content-language integration in CLIL and multilingual education (Dalton-Puffer, 2013)	European Journal of Applied Linguistics	125
4	An Observation Tool for Effective L2 Pedagogy in Content and Language Integrated Learning (CLIL), (De Graaff, 2007)	International Journal of Bilingual Education and Bilingualism	119
5	Conceptualising the potential role of L1 in CLIL (Lin Amy, 2015)	Language, Culture and Curriculum	118
6	Content and Language Integrated Learning: Panacea or Policy Borrowing Myth? (Paran, 2013)	Applied Linguistics Review	93
7	The training and accreditation of teachers for English medium instruction: an overview of practice in European universities (O’dowd, 2018)	International Journal of Bilingual Education and Bilingualism	85
8	Teacher training needs for bilingual education: in-service teacher perceptions (Perez Canado, 2016)	International Journal of Bilingual Education and Bilingualism	84
9	CLIL in Sweden – why does it not work? A metaperspective on CLIL across contexts in Europe (Sylvén, 2013)	International Journal of Bilingual Education and Bilingualism	78
10	Are teachers ready for CLIL? Evidence from a European study (Perez Canado, 2016)	European Journal of Teacher Education	65

Publication and Citation Trend

Throughout the last 16 years (2007–2023), there is a noticeable and consistent upward trajectory in research publications related to multilingual teacher education. Notably, 2007 marked the lowest point with just four publications, while 2022 reached its pinnacle with 60 publications (Figure 2A). On the contrary, the annual mean citation trend exhibits a gradual and somewhat irregular rise, with the highest mean citation of 5.65 observed in 2012 (Figure 2B).



A

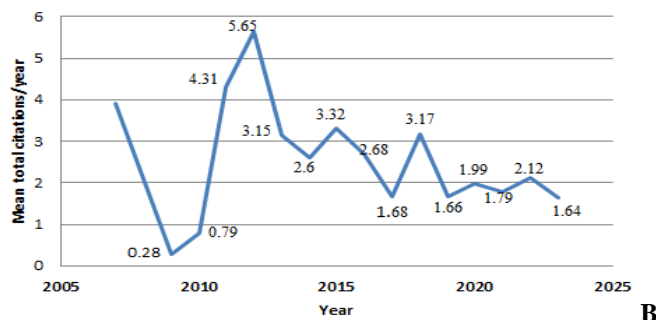


Figure 2. Worldwide annual pattern of (A) multilingual teacher education research publications and (B) citations

Highly Productive Universities and Their Collaborative Network

University of Jyväskylä was found to be the most productive university (n of articles = 14) followed by Universidad De Cordoba (n of articles = 10) in multilingual teacher education research, worldwide. The top five collaborative networks among universities based on the leading eigenvalues clustering algorithm assessing betweenness centrality were identified between (i) University of Jyväskylä, (ii) Universidad de Córdoba, (iii) The University of Hong Kong, (iv) Universidad Autónoma De Madrid, and (v) Universidad De Castilla-la Mancha (Figure 3).

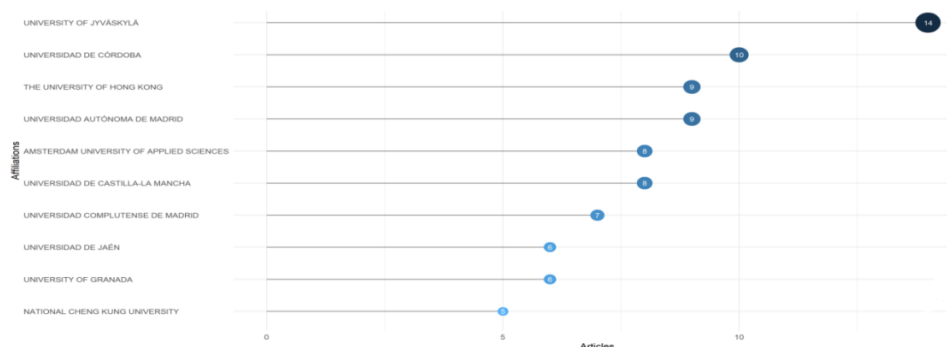


Figure 3. The ten most influential universities in the past 16 years (2007–2023)

Top Contributing Authors and Their Collaborative Networks

Our analysis of 16 years of research in the field of multilingual teacher education identifies the leading authors: (i) Lo Yu (n = 10), (ii) Banegas D.L. (n = 9) and (iii) Ostdam R. (n = 6) (Figure 4). In addition, we identified the most cited authors using the clustering method of "Leading eigenvalues" based on "Betweenness" as (i) De Graff, (ii) Banegas and (iii) Lo YY in our analysis of co-citations.

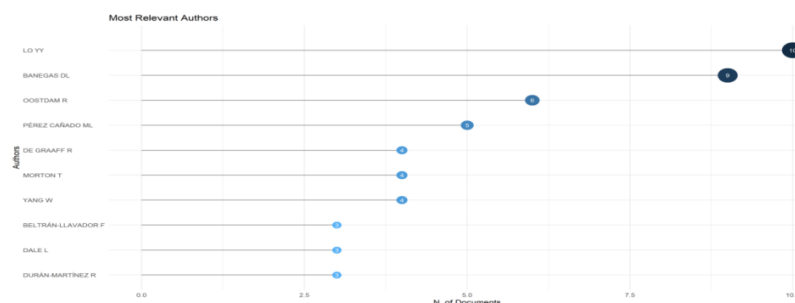


Figure 4. The top ten contributing authors working on multilingual teacher education research in the past 16 years (2007–2023)

Top Journals by Research Output

Around 16% of the total publications on our topic appeared in the International Journal of Bilingual Education and Bilingualism, followed by the Language Learning Journal (13%) and Porta Linguarum (12%) (Table 2). Interestingly, a significant portion of journals addressing multilingual teacher

education were not classified as high-impact or ranked in Q1/Q2 categories according to the 2022 JCR®, WoS. Instead, 64% of these journals were in Q1/Q2, while 36% were categorized in Q3/Q4.

Table 2. Top Ten Journals Publishing Multilingual Teacher Education Research (2007-2023)

Rank	Name of journal	Country	N of papers published on the topic (%), n = 286	h-Index	Total Citations	JCR® 2022 Impact Factor	JCR® 2022 Category (Quartile)
1	International Journal of Bilingual Education and Bilingualism	England	45 (16%)	21	1226	2.8	Education & Educational Research (Q2); Linguistics (Q1)
2	Language Learning Journal	England	13 (4.5%)	8	227	2.0	Education & Educational Research (Q1)
3	Porta Linguarum	Spain	12 (4.1%)	6	72	1.2	Education & Educational Research (Q4) Linguistics (Q2)
4	Language Teaching Research	New Zealand	6 (2%)	3	43	4.2	Education & Educational Research (Q1) Linguistics (Q1)
5	European Journal of Applied Linguistics	Germany	5 (1.7%)	3	150	1.5	Linguistics (Q3)
6	AILA review	Netherlands	4 (1.4%)	1	196	0.4	Linguistics (Q4)
7	European Journal of Teacher Education	England	4 (1.4%)	3	116	6.1	Education & Educational Research (Q1)
8	Language and Education	England	4 (1.4%)	4	118	1.9	Education & Educational Research (Q3); Linguistics (Q2)
9	Teaching and Teacher Education	England	4 (1.4%)	2	52	3.9	Education & Educational Research (Q1)
10	Dutch Journal of Applied Linguistics	Netherlands	3 (1%)	3	17	0.5	Linguistics (Q4)

Global Research Output and Collaborative Endeavors

Figure 5A highlights the top ten countries actively involved in multilingual teacher education, with Spain, China, and the UK leading the pack. Our analysis revealed a total of 3,014 collaborations between countries, enabling us to pinpoint the ten most significant global collaborations within this research domain.

In the sunburst plot depicted in Figure 5B, we observed that the majority of collaborative works published between 2007 and 2023 occurred between Spain and the UK (frequency = 3), China and Hong Kong (frequency = 3), and Spain and Hong Kong (frequency = 2).

Figure 5C presents a comprehensive worldwide collaboration map, offering insights into the interactions among researchers engaged in multilingual teacher education.

To offer a comprehensive insight into the research collaboration dynamics within multilingual teacher education spanning from 2007 to 2023, A three-fields plot has been created, as shown in Figure 5D, to illustrate the connections among the top ten journals, universities, and countries involved in this research area. The height of the rectangular nodes within the collaboration network represents their frequency of occurrence.

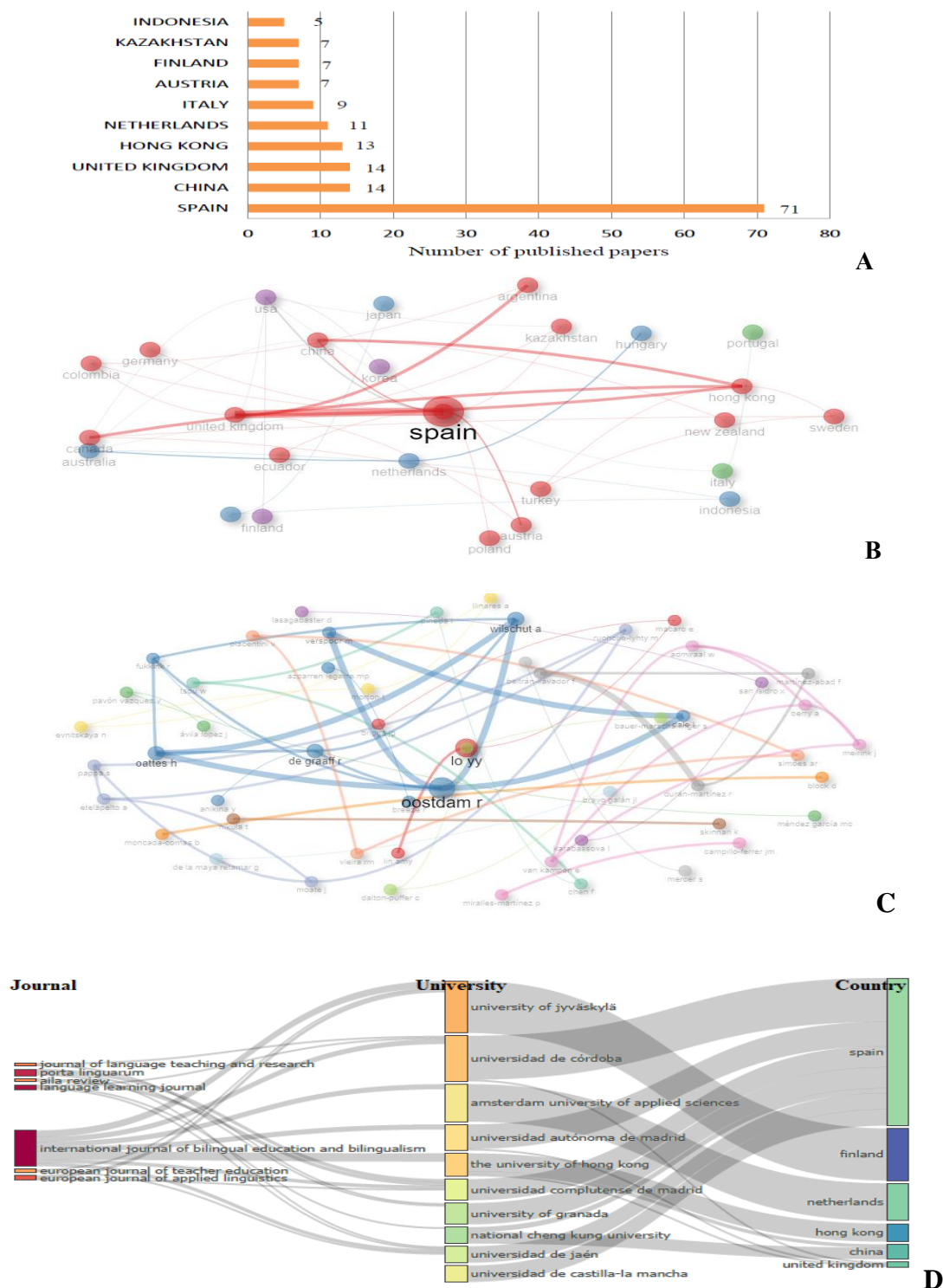


Figure 5. (A) Leading countries; (B) Top ten collaborating countries; (C) Worldwide collaboration map of researchers in multilingual teacher education research (2007–2023); and (D) Three-Fields Plot illustrating interactions among the leading journals, universities, and countries in multilingual teacher education research over the past 16 years. (2007–2023)

Discussion. Recent years have witnessed growing interest in bibliometric analyses within scientific communities (Kelly et al., 2010; Sugimoto et al., 2019). Bibliometric studies offer a quantitative, bias-free approach to examining bibliographic materials and mapping research fields (Zupic & Čater, 2015). Our bibliometric investigation into multilingual teacher education research spanning from 2007 to 2023 uncovered a consistent annual growth in the publication of articles, with a notable peak of 60 documents in 2022. However, the mean total citation count has declined over the last decade (2013 to 2023), likely because older publications receive more citations than newer ones from the same year. Notably, Spain emerged as the primary contributor to multilingual teacher education research, reflecting its strong focus on multilingualism. Additionally, 70% of the top ten productive countries were European, while Kazakhstan, Indonesia, and China represented the leading Asian countries in terms of research productivity in multilingual teacher education.

Regarding top journals by the number of published papers, it's worth highlighting that high paper count doesn't necessarily correlate with high impact factor. For instance, the International Journal of Bilingual Education and Bilingualism ranks high in terms of published papers but has a lower impact factor compared to other journals.

In examining the most cited documents, the research article titled "I don't teach language": The linguistic attitudes of physics lecturers in Sweden by Airey (2012) stands out with a total of 196 citations. Spain, China, and the United Kingdom emerged as prominent countries in terms of the number of articles on the subject. Furthermore, the University of Jyväskylä, Universidad De Cordoba, and the University of Hong Kong were among the universities contributing significantly to multilingual teacher education research.

Conclusion. Bibliometric analysis serves as a valuable tool for researchers, offering a comprehensive understanding of a specific topic. It enables researchers to explore existing literature, pinpoint areas of opportunity, and make informed decisions about future research directions (Akyol & Kocyigit, 2021a; Tekin & Bahşi, 2021). This method is particularly useful for assessing global scientific production trends within specialized domains (Kocyigit, 2023).

The results of this study underscore a notable upward trajectory in articles related to multilingual teacher education research, indicating a growing interest and emphasis in this field. Researchers interested in this area can benefit from establishing collaborations with leading authors and institutions, identifying research hotspots and gaps, and steering their future research endeavors in the right direction.

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БІЛІМ БЕРУ ЖҮЙЕСІНДЕ ЖАСАНДЫ ИНТЕЛЛЕКТІНІ ҚОЛДАНУ

Аңдатпа

Жасанды интеллекттің дамуымен математикалық дағдыларды бағалауды автоматтандырудың жаңа перспективалары пайда болады. Жасанды интеллектке негізделген инновациялық жүйелер алынған деректерді талдауға ғана емес, сонымен қатар білім алушылардың жеке қажеттіліктерін ескере отырып, бағалау процесін бейімдеуге де қабілетті. Қазіргі заманғы технологиялар нәтижелерді неғұрлым дәл түсіндіруді қамтамасыз ететін, субъективті факторды барынша азайтатын және білім беру процесінің тиімділігін арттыратын алгоритмдер жасауға мүмкіндік береді.

Мақалада соңғы онжылдықтарда жасанды интеллекттің серпінді дамуы, сондай-ақ оны білім беруді қоса алғанда, әртүрлі салаларда кеңінен қолдану қарастырылады. Оқу процесін оңтайландыруда, білімді автоматтандырылған тексеруде және оқытуды дербестендіруде ақпараттық технологиялардың рөліне ерекше назар аударылады. Автордың айтуынша, жасанды интеллектті білім беру жүйесіне ықпалдастыру оқытушылар мен білім алушылар үшін жаңа мүмкіндіктер ашады.

Түйін сөздер: жасанды интеллект, ақпараттық технологиялар, білім берудегі жасанды интеллект, жасанды интеллектті қолдайтын жүйелер.