



# A Bibliometric Analysis of Artificial Intelligence Research in Public Health Education

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**Abstract.** The study explores the burgeoning field of "AI in public health education" using data from the Scopus database spanning 2013 to 2023. Through a comprehensive bibliometric analysis, we examined 3404 documents across 1149 sources, identifying key trends, subject areas, and leading institutions. Our methods included analyzing publication growth rates, citation metrics, keyword frequencies, and collaboration patterns. Results revealed an impressive annual growth rate of 95.97%, a high degree of international collaboration, and significant contributions from top-tier global institutions, particularly in medicine, computer science, and engineering. We identified emerging research topics such as federated learning, blockchain, and disease outbreak management as areas with substantial future research potential. Our conclusion underscores the rapid development and interdisciplinary nature of this field, highlighting the importance of fostering collaboration, securing targeted funding, and integrating emerging topics into public health education to effectively address global health challenges through advanced AI methodologies.

**Keywords:** Algorithms, preventive medicine, health education, knowledge discovery.

## 1. Introduction

Artificial intelligence (AI) has been transforming various aspects of healthcare, including public health [1][2][3]. Recent years have seen a surge in interest in the application of AI in public health, particularly in the fields of predictive modeling and public health surveillance [4]. AI algorithms have been used to forecast the spread of infectious diseases, enabling public health officials to take preventive measures [5]. Additionally, AI has been employed in analyzing vast amounts of data from social media and other sources to identify potential outbreaks and monitor disease spread [6]. These advancements have significant implications for public health education, where AI can be leveraged to create more personalized and effective health education programs [7][8][9][10]. The integration of AI in public health education offers significant potential for enhancing the quality and efficiency of health education programs.

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The integration of AI in public health education can have numerous benefits. For instance, AI-powered chatbots can provide personalized health advice and support to individuals, enhancing the overall health literacy and awareness among the population [11][12]. AI can also be used to analyze large datasets and identify patterns in health behaviors, allowing for more targeted interventions and improved health outcomes [13][14][15]. Furthermore, AI can help streamline administrative tasks, freeing up healthcare professionals to focus on more critical aspects of health education [16][17][18]. Despite the potential benefits, there are also challenges associated with integrating AI in public health education [19]. One major concern is the need for robust data infrastructure and technical expertise to support AI applications [20]. Additionally, there are ethical and legal considerations such as data privacy and surveillance, safety, transparency, fairness, and biases of algorithms that must be addressed to ensure the effective integration of AI in public health education [21][22].

This study aims to contribute to the existing body of research on AI in public health education by conducting a bibliometrics analysis. Bibliometric analysis is a powerful tool for understanding the current state of research [23]. The analysis will examine the current state of research in this area, identifying key trends, patterns, and gaps in the literature. The findings will provide insights into the potential of AI in public health education and inform future research directions, ultimately contributing to the development of more effective and efficient health education programs.

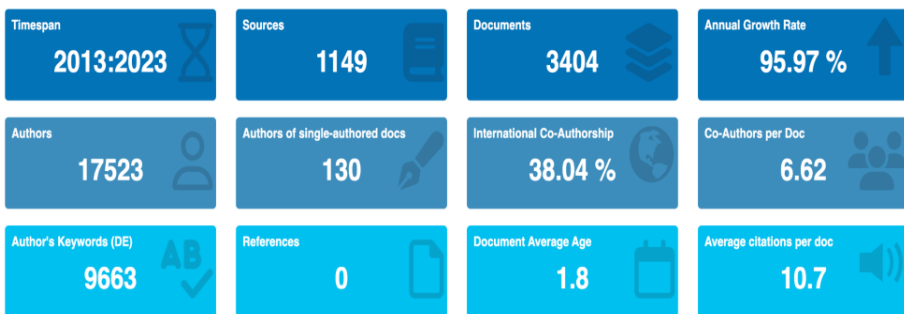
## 2. Material and Method

This study employs a systematic bibliometric analysis of the literature on AI in public health education, focusing on the Scopus database. The search strategy involves a combination of keywords “ALL ( "artificial intelligence" ) AND ALL ( "public health education" ) AND PUBYEAR > 2012 AND PUBYEAR < 2024 AND ( LIMIT-TO ( DOCTYPE , "ar" ) ) AND ( LIMIT-TO ( LANGUAGE , "English" ) ) AND ( LIMIT-TO ( OA , "all" ) )” to provide a wider landscape in the field. Further, this study only included the last decade publications (2013-2023), open access English language and original articles. Thus we excluded those of review, non-English language, conference paper and subscription based articles.

The VOSViewer and Bibliometrix package in the R environment [24] are then employed to conduct the bibliometric analysis. Some metrics would be analyzed: calculating the number of publications per year to identify temporal trends, analyzing the geographic distribution of publications based on author affiliations, analyzing co-authorship networks, co-citation, and keyword co-occurrence, and creating network visualization maps to identify major research clusters and relationships between topics.

### 3. Result and Discussion

The exploration of "AI in public health education" within the Scopus database from 2013 to 2023 reveals a burgeoning field with remarkable growth. Over this period, 3404 documents have been published across 1149 sources, showcasing an impressive annual growth rate of 95.97%, presented in **figure 1**. The documents are relatively recent, with an average age of just 1.8 years, indicating the contemporary relevance of this research area. Each document garners an average of 10.7 citations, underscoring the academic impact and interest in this topic.



**Figure 1.** Summary and general overview of the research

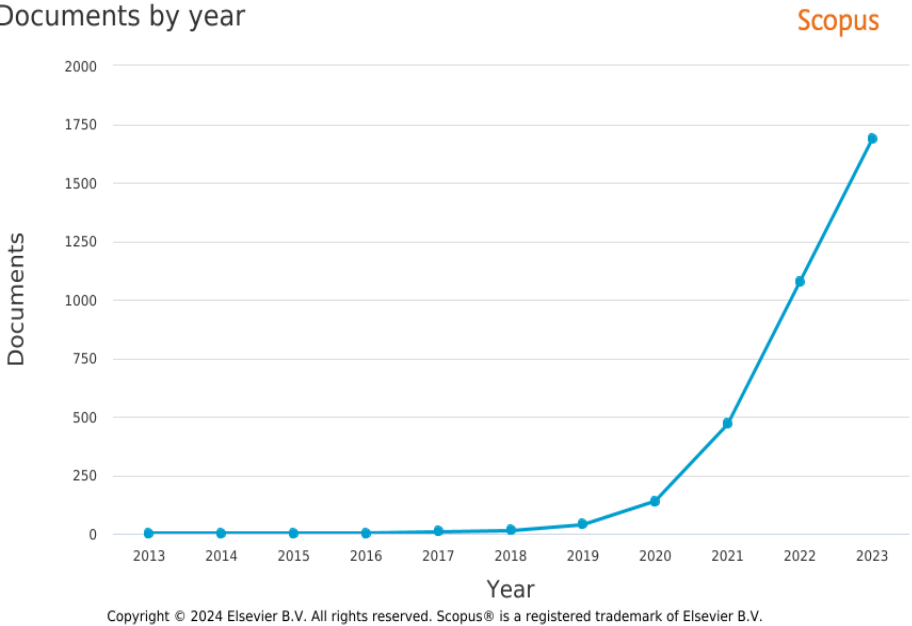
The content of these documents is rich and varied, with 14,194 Keywords Plus and 9,663 Author's Keywords, reflecting a wide array of research focuses and terminologies. The research community involved is extensive, with 17,523 authors contributing, among whom 130 have single-authored documents. The collaboration is notably high, with an average of 6.62 co-authors per document and 38.04% of these works involving international co-authorships, highlighting the global effort in advancing AI in public health education.

This vibrant and collaborative research landscape demonstrates the rapid development and growing significance of integrating AI education within the public health domain, driven by an international community committed to addressing global health challenges through advanced educational methodologies.

The distribution of articles published on "AI in public health education" from 2013 to 2023 illustrates a dramatic increase in research activity over the past decade. The numbers indicate a growing interest and recognition of the importance of AI in public health education, reflecting both technological advancements and heightened awareness of public health challenges. **Figure 2** depicts that the exponential growth occurs 2020 onward. This explosion in research output can be attributed to several factors, such as

pandemic influence, technological advancement in AI, and increased funding and collaboration.

Documents by year



**Figure 2.** Article published by years

**Table 1** depicts the distribution of published articles by subject area. The varied distribution of documents across these subject areas illustrates the multifaceted nature of AI in public health education. It involves a collaborative effort across multiple disciplines, each contributing unique insights and advancements to the field. This interdisciplinary approach is essential for addressing the complex and interconnected challenges faced in public health education and practice.

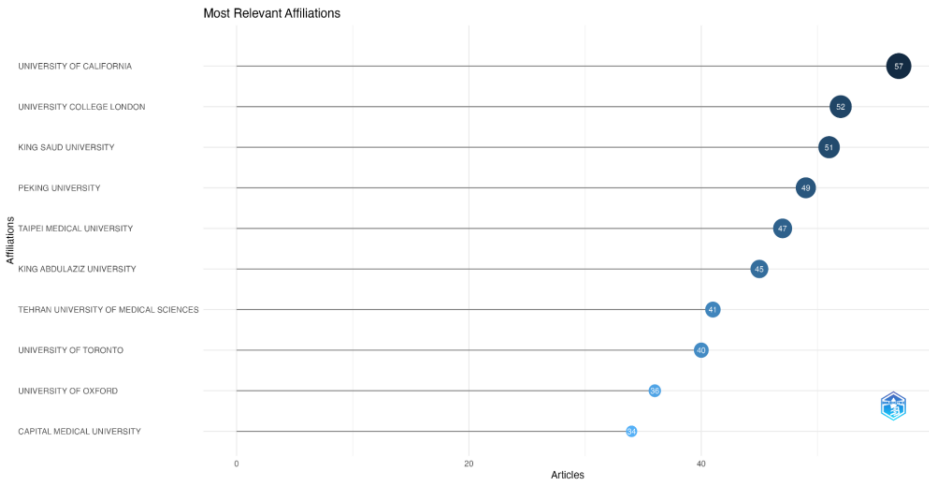
**Table 1.** The distribution of published articles by subject area.

Subject area	Articles (%)
Medicine	1468 (29.2)
Computer Science	1069 (21.3)
Engineering	705 (14.0)
Social Sciences	435 (8.7)
Biochemistry, Genetics and Molecular Biology	336 (6.7)
Environmental Science	329 (6.6)
Multidisciplinary	249 (5.0)
Mathematics	228 (4.5)

Materials Science	207 (4.1)
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Further exploration, **Figure 3** presented the articles publication by institution affiliation. The analysis can be explained by several viewpoints:

1. **Geographical Diversity:** The institutions listed represent a diverse geographical spread, including North America, Europe, Asia, and the Middle East. This indicates that research on AI in public health education is a global endeavor.
2. **Leading Institutions:** Many of these institutions are globally recognized for their research output and academic excellence, suggesting that top-tier universities are heavily investing in this area.
3. **Regional Investments:** The presence of multiple universities from China and Saudi Arabia suggests significant regional investments in AI and public health, likely driven by national priorities and funding initiatives.
4. **Interdisciplinary Collaboration:** The diverse affiliations imply strong interdisciplinary collaboration, as AI in public health education intersects with various fields such as medicine, computer science, and social sciences.



**Figure 3.** Article number based on affiliation

Moving on to the potential future research topic, **Figure 4.** Potential future research topics are indicated by yellow circles, with the color representing recency and the size of the circles indicating publication density. The small yellow circles representing federated learning, medical services, blockchain, disease outbreak, human-computer interaction, satisfaction, population research, and disease burden highlight emerging or niche areas in AI in public health education. These topics present opportunities for future research to develop privacy-preserving AI models, optimize healthcare delivery, secure health data,



effort is essential in tackling the complex challenges inherent in public health education and practice.

The distribution of articles across various subject areas, including medicine, computer science, and engineering, emphasizes the interdisciplinary nature of this research. Leading institutions from around the globe are actively contributing, driven by both regional investments and national priorities, indicating a widespread commitment to advancing AI in public health education.

Looking forward, the identified potential research topics such as federated learning, blockchain, and disease outbreak management, highlight promising avenues for future exploration. These emerging areas present opportunities for developing innovative solutions to enhance privacy, optimize healthcare delivery, and improve educational methodologies. To fully harness the potential of AI in public health education, fostering interdisciplinary collaboration, securing targeted funding, and integrating these topics into curricula will be crucial. This proactive approach will prepare professionals to address the evolving landscape of global health challenges effectively.

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