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Mapping Interdisciplinary Research Trends in Health-care, Education, Leadership and Digital Health: A Bibliometric Analysis

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Abstract:

This paper examines the interdisciplinary research trends in health care Education, leadership analyzed and digital health through a bibliometric analysis. The Lens database was searched for bibliographic records in May 2026 and was analyzed using VOSviewer software. A total of 100 records were used to conduct keyword co-occurrence mapping and thematic cluster analysis to identify the main themes associated with the research and their relationships with other. The results identify six large thematic clusters related to Education/research development, human-centred health care research, health care and nursing, leadership/professional development, public health/community well-being and curriculum/clinical practice. The findings suggest that the term "Education" was the most prominent and connected theme by a reliable margin, linking health care, public health, leadership, nursing, digital health and technological advancements. Emerging themes such as artificial intelligence, cultural competency, mental health, sustainability and digital health care were also recognized as additional areas of scholarly interest. The implications of this analysis include the increasing occurrence of interdisciplinary collaborations across health care, academics, leadership and technological areas. This research is an initial step towards providing a clearer understanding of the evolving research goals of these areas and building a systematic knowledge map that may help strengthen research, policy development and/or strategic planning efforts in health care Education and digital health.

Keywords: Bibliometric Analysis, Interdisciplinary Research, Health-care, Education, Leadership, Digital Health.

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INTRODUCTION:

The confluence of Education, health-care, leadership and technology is one of the most important developments that span across various academic and professional fields. With new and emerging technologies transforming health-care around the world, advances in digital communication, AI, as well as new and innovative methods of delivering Educational programs are providing researchers, educators, health-care providers and policy-makers with both opportunities and challenges. As such, many Educational institutions and health-care organizations are increasingly focused on creating a 21st century learning ecosystem to support Digital Health, Leadership Development, Environmental Awareness, Public Health Communication and Technology Enhanced Delivery of Care. As a result, the amount of research taking place in these inter-related disciplines has markedly increased within the international databases of academia. Health-care Education has moved away from traditional "teach and learn" models toward models based on interdisciplinary cooperation and collaboration, digital competence, cultural sensitivity and evidence-based practices. The proliferation of digital health technologies, tele mental health and artificial intelligence has greatly impacted the development of curriculum and training approaches for health-care professionals in the global marketplace. At the same time, the impact of public health emergencies, climate change, mental health issues and inequities in global health-care delivery have heightened the need for agile Educational systems to support the professionals who will be leading the charge in changing the face of health-care delivery across the globe. The total volume of research produced by academic researchers regarding health-care leadership, nursing Education, medical training, sustainability practices, public health promotion and patient-focused Educational models has been substantial in today’s academic landscape. Also, bibliometric analysis has emerged as an integral method for comprehending the intellectual framework, research trajectories and theme development of academia. Bibliometric studies

utilize quantitative techniques for examining publication patterns, relationships among keywords, citation networks and collaborations across scholarly literature as a whole. By enabling researchers to graphically examine complicated research connections through network mapping and clustering analysis (for instance, through VOSviewer), bibliometric tools assist in determining dominant research themes and emerging subjects, as well as connections between disciplines within academia. Furthermore, using maps of knowledge, researchers can help identify the research gaps, define what future directions should be studied and determine what areas of research will be valued in the future within rapidly growing fields like health-care teaching or digital health. This paper seeks to determine how bibliometric analysis and VOSviewer are used to map interdisciplinary research trends in health-care Education, leadership and digital health. The analysis was accomplished by utilizing the The Lens database, which consists of extensive metadata and citation datasets. The purpose of this study is to use the theoretical frameworks of keyword co-occurrence and theme clustering to explore the relationships among significant research topics including Education, health care, leadership, public health, nursing, curriculum design, sustainability, artificial intelligence and qualitative analysis. The use of VOSviewer for visual representation allows for a clearer understanding of how these fields are related to each other and how Education serves as a major connect point for many areas of health-care and technology-related research. The study also aims to provide researchers with a better understanding of the expanding interdisciplinary character of health-care Educational research by identifying emerging areas of scholarly interest. By conducting an analysis of theme clusters and network relationships, this study will add to the body of knowledge regarding the ways that Educational practices, digital innovations, leadership models and health-care systems have changed together in the global academic arena. Ultimately, the results from this research could aid researchers, Educational institutions, health care professionals and policy-makers in identifying the current research

priorities as well as developing future interdisciplinary approaches to health-care Education through digital transformation.

LITERATURE REVIEW:

1. Bibliometric analysis has become an increasingly important approach for examining the intellectual structure and evolution of academic disciplines. Donthu et al. (2021) emphasized the value of bibliometric methods in identifying publication patterns, research trends and thematic developments across scientific fields. Similarly, Zupic and Čater (2015) highlighted the usefulness of bibliometric techniques in understanding scholarly networks and research evolution, while Van Eck and Waltman (2010) introduced VOSviewer as a widely used software tool for constructing and visualizing bibliometric relationships.
2. The transformation of health-care Education has received considerable attention in the academic literature. Frenk et al. (2010) argued that health-care Education systems must evolve toward interdisciplinary and competency-based models capable of responding to global health-care challenges. Harden (2006) further emphasized curriculum innovation and the integration of practical health-care competencies within Educational systems. Reimers and Schleicher (2020) demonstrated how Educational institutions adapted to global crises through flexible and technology-enabled learning approaches.
3. The emergence of digital health technologies has significantly influenced health-care Education and professional training. The World Health Organization (2021) highlighted the strategic importance of digital health technologies in strengthening health-care systems and workforce development. Topol (2019) discussed the transformative role of artificial intelligence in improving health-care delivery and medical Education. Patel et al. (2020)

similarly identified increasing adoption of digital learning tools, online Education platforms and technology-enabled health-care training systems.

4. Leadership and workforce development have also emerged as critical themes within health-care research. Crisp and Chen (2014) emphasized the challenges associated with health-care workforce development and the growing need for professional training and leadership competencies. In addition, Siemens (2005) introduced Connectivism as a learning theory appropriate for digital learning environments, emphasizing knowledge creation through interconnected networks and collaborative learning systems.
5. Despite the growing body of literature on health-care Education, leadership and digital health, limited studies have comprehensively examined the thematic relationships among these fields using bibliometric visualisation techniques. Most existing studies focus on individual dimensions of health-care Education or technological transformation rather than exploring their interconnected intellectual structure. Therefore, the present study seeks to address this gap through keyword co-occurrence analysis and bibliometric mapping using VOSviewer.

RESEARCH GAP:

Although previous studies have examined health-care Education, digital health technologies, leadership development, public health communication and health-care workforce training independently, limited research has systematically explored the intellectual relationships connecting these domains through bibliometric mapping techniques. Existing studies primarily focus on specific Educational interventions, health-care technologies or leadership practices rather than examining how these themes interact within a broader interdisciplinary research landscape. Furthermore, few studies have employed keyword co-occurrence analysis and network visualisation methods to identify emerging thematic relationships among health-care

Education, leadership, public health and digital transformation. Therefore, this study addresses this gap by providing a comprehensive bibliometric mapping of interdisciplinary research trends using VOSviewer-based network analysis.

OBJECTIVES OF THE STUDY:

1. To examine worldwide patterns in research regarding health-care Education, leadership and digital health using bibliometric methods.
2. To identify distinct clusters of themes and types of co-occurring keywords related to interdisciplinary research in health-care Education.
3. To analyze the interplay between Education, health-care, leadership, public health and digital transformation in the academic literature.
4. To evaluate themes that have recently emerged in research related to health-care Education (e.g., artificial intelligence, sustainability, curriculum development and mental health).
5. To identify future research opportunities and interdisciplinary directions through the use of VOSviewer network visualisation techniques.

LIMITATIONS OF THE STUDY:

1. The study used only secondary data obtained from The Lens database hence it does not contain primary data collection procedures such as surveys or interviews.
2. The accuracy of results depends on how accurate and available bibliographic records are in the database used for this research.
3. This research focuses mostly on keyword co-occurrence analysis and thematic visualisation which could lead to results that do not accurately reflect all intellectual depth associated with each publication.

4. The researcher's interpretation of thematic clusters produced through VOSviewer involves the subjective analysis by the researcher.
5. The research only looks at keywords selected and the dataset to be exported so there might be some potential publications that are not included because they fall outside of your defined criteria for the study.
6. Citation and bibliometric studies tend to prefer large amounts of citations and/or large numbers of publications, thus leading researchers to underreport emerging and regional publications.

RESEARCH METHODOLOGY:

This research employs a secondary research approach by conducting a bibliometric analysis and a Scientometrics analysis to determine the trends of interdisciplinary research in the areas of health care Education, health care leadership and digital health. The data for this research was acquired from the The Lens database in a CSV format and consists of secondary data related to the keywords of health care Education, public health, health care leadership, digital transformation, nursing, sustainability and artificial intelligence. The dataset consisted of scholarly publications extracted from the The Lens database based on selected keywords related to health-care Education, digital health, leadership, public health and interdisciplinary health-care research. The collected records were filtered based on relevance, publication metadata and keyword occurrence. The search focused primarily on English-language scholarly publications published between 2010 and 2025 that were relevant to health-care Education, leadership, digital health and public health. The search strategy included combinations of keywords associated with health-care Education, health-care leadership, digital health, public health, nursing Education, health-care training and interdisciplinary health-care research. The keyword strategy was designed to capture interdisciplinary research

across health-care Education, nursing Education, health-care leadership, digital health, public health and health-care training. These keywords were selected to ensure broad coverage of the major thematic areas represented within the study. Each of these terms will provide coverage across multiple disciplines. A total of 100 records were exported from the The Lens database for analysis. The records were screened for relevance and bibliographic completeness before being imported into VOSviewer for network visualisation and keyword co-occurrence analysis.

Sr. No.	Item	Description
1.	Database Used	The Lens
2.	Search Date	May 2026
3.	Publication Period	2010-2025
4.	Language	English
5.	Initial Records Retrieved	100
6.	Records Screened	100
7.	Final Records Analyzed	100
8.	Software Used	VOSviewer
9.	Analysis Technique	Keyword Co-occurrence Analysis
10.	Visualisation Method	Network Mapping

DATA ANALYSIS:

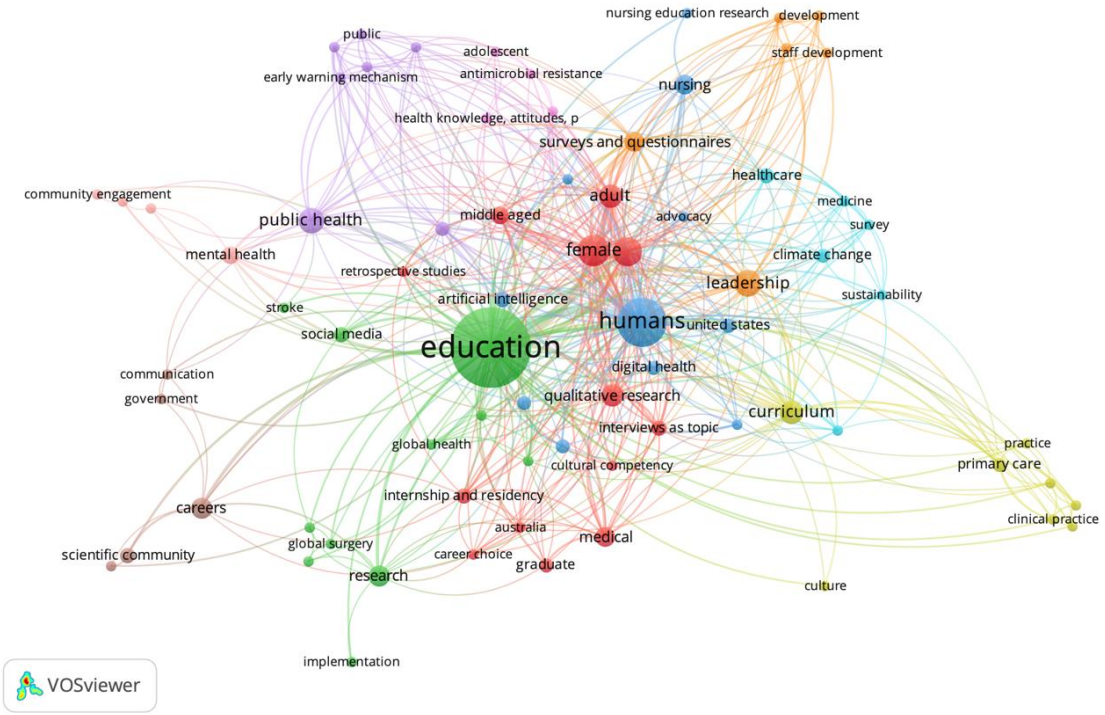

Figure 1: Keyword Co-occurrence Network Visualisation Generated using VOSviewer.

Sr. No.	Cluster	Major Keywords
1.	Green	Education, Research, Global Health, Artificial Intelligence, Social Media
2.	Red	Female, Adult, Medical, Qualitative Research, Cultural Competency
3.	Blue	Human, Nursing, Digital Health, Health-care
4.	Orange	Leadership, Staff Development, Surveys and Questionnaire
5.	Purple	Public Health, Mental Health, Antimicrobial Resistance
6.	Yellow	Curriculum, Clinical Practice, Primary Care

Using VOSviewer to analyze a selected bibliometric data set, Figure 1 shows the keyword co-occurrence network. The visualisation is a complex interrelated research area with distinct,

thematic clusters associated with health-care Education; public health; leadership in health-care; nursing; curriculum development; and digital health. The largest and most influential node in the network, "Education", forms a central point connecting numerous research themes. The structure of the clusters reflects a significant number of interdisciplinary connections between health care systems; Education methods; leadership development; initiatives in public health; and emerging digital technologies.

Cluster 1	Education, Research and Digital Development (Green Cluster)	The color green is the primary color used in this cluster to represent Education, which is the node that contains the largest number of total connections. There is a very strong connection between all of the other nodes (Research, Global Health, Social Media, Artificial Intelligence, Implementation and Global Surgery) in the Network. This cluster represents how new Educational practices are being integrated with technology, digital communication and Evidence Based Health-care Research. With Education being such a prominent node, it can be concluded that Education is a central theme linking together several of the other interdisciplinary areas of research within this Network.
Cluster 2	Human-Centred Health-care and Qualitative Research (Red Cluster)	The red cluster is based on the terms: "female," "adult," "medical," and "qualitative research." Related concepts include cultural competence,

		graduate, choice of career and interviews as subjects; however, they primarily indicate an emphasis on patient-centred care, building the health-care workforce and providing socially responsible health-care Education. The red cluster highlights the growing importance placed on diversity, inclusiveness, behavioural research and understanding human experiences in relation to the health-care system.
Cluster 3	Health-care, Nursing and Digital Health (Blue Cluster)	The blue cluster is dominated by the keyword "humans," which is strongly linked to nursing, digital health, advocacy and health-care. The cluster reflects research focused on health-care delivery, patient care, professional nursing Education and the growing influence of digital technologies in health-care environments. The presence of digital health suggests increasing adoption of technology-enabled health-care services and professional training systems.
Cluster 4	Leadership and Professional Development (Orange Cluster)	The orange cluster includes leadership, health-care, staff development, surveys and questionnaires and development. The relationships among these keywords indicate growing interest in health-care leadership organizational management, workforce

		training and institutional development. This cluster demonstrates the importance of leadership competencies in improving health-care quality, service delivery and professional development.
Cluster 5	Public Health and Community Well-Being (Purple Cluster)	The purple cluster includes mental health, antimicrobial resistance, adolescent health, public awareness of health and knowledge of health. These themes represent a growing concern for preventative health care as well as for educating the public about health, the need to engage communities in addressing global health issues and the challenges of developing new approaches to improving population health. The purple cluster also shows how health-care Education is used to create awareness about health issues and to promote better health outcomes.
Cluster 6	Curriculum and Clinical Practice (Yellow Cluster)	The yellow cluster refers to many things, including: curriculum, practice, primary health care, clinical practice and culture. The yellow cluster focuses on the development of competency-based Education, development of curriculum through integrated curriculum design and execution of academic learning in

		congruence with practical applications in the health care field. The rapidly developing need for health-care providers to be trained using frameworks of Education that are relevant to clinical practice and provide hands-on experience is demonstrated through the yellow cluster.

The VOSviewer visualisation exhibits a clear illustration of how cross-disciplinary Health-care Education Research has developed into an increasingly interconnected area of interdisciplinary research. The data shows that there are not only many areas connected to Education, but also many areas that include health-care systems, leadership, digital technologies, curriculum development, sustainability, public health and human-centred approaches to research. The network structure indicates not only that there is evidence of digital transformation, AI and development of leadership, but also that these areas are emerging as critical points of focus for contemporary health-care Education research. In addition, the clusters' widespread connectivity demonstrates continued collaboration between Educational institutions, health-care practitioners, policy-makers and researchers in technology.

FINDINGS AND CONCLUSION:

An analysis of the records from the exported The Lens database has uncovered meaningful connections between the fields of Education, health-care systems, leadership, digital transformation, public health, curriculum development and new technological innovations. The research shows that the current landscape of health-care Education research is characterized by increasing levels of interdisciplinary research, technology-based focus and human-centred core

components. One of the key results in this study is that the word “Education” was found to dominate this research landscape as a central theme within the network visualisation. The relationship of “Education” with health-care, public health-care, leadership, nursing and digital health also demonstrates that transformational Education has become a fundamental component of all contemporary health-care systems, meaning that there is increasing focus among health and academic institutions on providing Education through training, professional development and competency-based learning to align with the evolving demands of the global health-care sector. The findings from the study indicate that technology and digital transformation are having a major impact on the Education and professional training of health-care providers. The study's use of key terms, such as social media, AI, digital health, implementation and global health, illustrates how totally technology-driven, Education delivery models are changing the way in which health-care is trained and experienced through research and Education. Emerging themes within the study reflect the increasing use of telemedicine training, AI in Education in health-care and digital communication systems in the delivery of patient care, as indicated in the growing number of patients who are using online learning resources to complete their Education, easy access to telehealth services and AI tools that enhance learning. A major theme is the continuing expanding role of leadership and management issues in health-care research. Visualisation maps demonstrate that the relationship between leadership and health-care including nursing and advocacy are closely related. Therefore, today's health-care systems will require more than just technical expertise in health-care, but effective leaders with the skills needed for managing health-care, implementing policies, responding to crises and developing institutions are an absolute must for the future of health-care Education and nursing Education programs. The findings of this study also indicated that there has been a significant emphasis on public health awareness, mental health and preventative health-care. In addition, the presence of themes regarding public

health, antimicrobial resistance, adolescence and mental well-being suggest that researchers are beginning to pay greater attention to global issues related to health care, as well as community-based approaches to health care delivery. Moreover, the incorporation of themes related to mental health and public awareness into the research indicates a growing recognition of psychological well-being and communication about health care as integral parts of the modern health care system. Additionally, the presence of sustainability and climate-related themes within the research suggests that the field of health care Education is expanding beyond just goals related to health and now includes larger social and environmental responsibilities. A strong presence of themes related to human-centred and qualitative research emerged in the visualisation presented as well. The presence of keywords such as "woman," "adult," "qualitative research," "interviews as topic," and "culturally-competent" demonstrates an increased interest in academic research regarding diversity, inclusivity, patient-centred care and culturally-responsive health care Education. This pattern points to a change in direction in the field of health care Education from traditional technical training in health care to more socially-sensitive, ethically-informed Educational practice. The discussion of the results indicates that the field of health care Education is currently undergoing a significant transformation caused by interdisciplinary collaboration, digital innovation and global issues in health care delivery. In addition, most Educational institutions that offer health care Education are placing greater emphasis on incorporating technology, providing leadership training, developing cultural understanding and promoting public health into the curricula of their health care programs. Health-care Education is now intricately linked to technology, leadership, communication and social science through research and this provides evidence of the findings of this study supporting its alternative hypothesis; that is, significant interdisciplinary relationships exist between the disciplines of health-care Education, leadership studies, digital health and public health. In addition, the VOSviewer network

analysis confirms the existence of strong thematic connections and collaborative partnerships between these areas of research. The use of bibliometrics confirmed emerging research trends and emerging priorities in global health-care Education research. In conclusion, this research has highlighted the ongoing multidisciplinary character of both health care Education and digital health research. The bibliometric visualisation illustrated that Education is the connecting theme between health-care leadership, public health, digital transformation, nursing, sustainability and human-centred research. The continuing integration of artificial intelligence, digital learning environments and leadership development suggests future health-care Education models will be more technologically advanced, collaborative and socially responsive. The research presented here has made a significant contribution to the existing body of academic literature by providing a systematic knowledge map of current health-care Education research trends.

FUTURE SCOPE OF RESEARCH:

1. Future studies may utilize several database options such as Scopus, Web of Science and PubMed in conducting comparative bibliometric reviews to allow for a more comprehensive coverage of research.
2. Researchers can conduct country, institution or author-level collaboration analyses to help identify patterns in the productivity of global research.
3. Future Studies may focus on artificial intelligence, telemedicine and digital learning systems within the context of health-care Education.
4. A combination of mixed methods research approaches may provide better practical understanding of current trends in health-care Education.
5. Longitudinal studies might be performed to examine how health-care Education research has changed over multiple periods of time.

6. Studies could include examining policy implications for interdisciplinary approaches to supporting health-care Education and sustainable development for global public health preparedness.

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