

**EDTECH AND ARTIFICIAL INTELLIGENCE: A BIBLIOMETRIC ANALYSIS OF RESEARCH TRENDS
IN EDUCATIONAL TECHNOLOGY**

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Abstract:

The rapid integration of Artificial Intelligence (AI) into educational technology (EdTech) has transformed teaching, learning, and educational management across the globe. This study conducts a bibliometric analysis to examine research trends in the intersection of EdTech and Artificial Intelligence. Using bibliometric data extracted from the OpenAlex database, the study analyses publication trends, open access patterns, research topics, and document types. The results reveal a significant increase in research output between 2020 and 2025, with a notable peak in 2025. The findings indicate that AI-driven personalized learning, intelligent tutoring systems, learning analytics, and digital pedagogy are among the most dominant themes in the literature. The study highlights the growing academic interest in AI-enabled educational tools and provides insights into emerging research directions. These findings contribute to understanding the evolving landscape of educational technology research and offer guidance for future scholarly work in this domain.

Keywords: *Educational Technology, Artificial Intelligence, EdTech, Bibliometric Analysis, Research Trends, Digital Learning*

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Introduction:

The education sector has undergone a major transformation due to the rapid development of digital technologies. Educational Technology (EdTech) has become an essential tool in modern learning environments, enabling innovative teaching methodologies, virtual classrooms, and adaptive learning systems. The integration of Artificial Intelligence (AI) into EdTech has further revolutionized the educational landscape by enabling personalized learning experiences, intelligent tutoring systems, and predictive learning analytics.

Artificial Intelligence applications in education include automated grading, adaptive learning platforms, student performance prediction, and AI-powered chatbots. These technologies enhance the efficiency of educators and improve student engagement and learning outcomes. In recent years, research on AI-

driven educational technologies has increased substantially, especially after the COVID-19 pandemic accelerated digital learning adoption worldwide. However, there is a need to systematically examine the growth, patterns, and trends of research in this emerging interdisciplinary field. Bibliometric analysis provides a quantitative approach to evaluating academic literature by examining publication patterns, research productivity, and thematic developments. By analysing bibliometric data, scholars can identify research trends, emerging topics, and influential contributions in a specific domain.

This study aims to conduct a bibliometric analysis of research related to EdTech and Artificial Intelligence using OpenAlex database data. The study evaluates publication trends over time and highlights the increasing importance of AI-driven educational innovations.

Objectives of the Study:

The study aims to:

1. Analyse the growth of research publications in EdTech and Artificial Intelligence.
2. Identify major research trends in the field of educational technology.
3. Examine publication patterns across years.
4. Understand the evolution of AI-related educational research.

Research Methodology:

Data Source:

The data for this study was extracted from the **OpenAlex bibliometric database**, which contains comprehensive metadata of scholarly publications

Results and Analysis:

1. Year-wise Publication Trends

The dataset indicates a significant increase in research publications on EdTech and Artificial Intelligence over the past few years.

including authorship, institutions, research topics, and publication types.

Data Collection:

Publications related to **Educational Technology and Artificial Intelligence** were collected and grouped based on publication year. The dataset includes articles, conference papers, and other scholarly outputs.

Method of Analysis

The study employs **bibliometric analysis**, which includes:

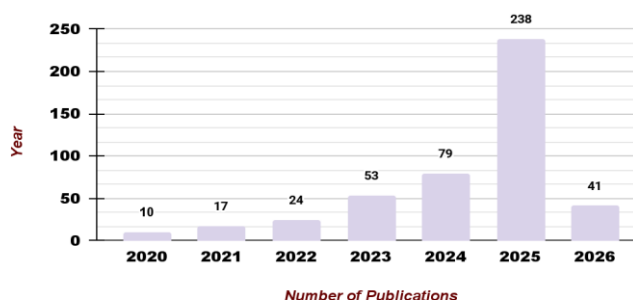
- Publication trend analysis
- Frequency distribution of research outputs
- Descriptive statistical analysis

The analysis covers the period **2020–2026**.

Year	Number of Publications
2020	10
2021	17
2022	24
2023	53
2024	79
2025	238
2026	41

(Source: Table no. 1. OpenAlex bibliometric database)

Year-wise Publication Trends



(Table no: 1. OpenAlex bibliometric database)

Interpretation:**1. Initial Growth Phase (2020–2022)**

Research publications increased gradually from 10 publications in 2020 to 24 in 2022. This phase reflects the early integration of AI technologies into digital learning environments.

2. Acceleration Phase (2023–2024)

Publications increased significantly to 53 in 2023 and 79 in 2024. This rise reflects the growing global interest in AI-based learning tools and the expansion of digital education platforms.

3. Rapid Expansion Phase (2025)

The highest number of publications (238) occurred in 2025, indicating a research boom in the field. This growth may be attributed to technological advancements in machine learning, generative AI, and adaptive learning systems.

4. Current Trend (2026)

The year 2026 shows 41 publications so far, indicating continuing research interest as the year progresses.

2. Open Access	
YES	347
NO	115

3. Primary Topic	
Name	Count
Online Learning and Analytics	63
Geochemistry and Geologic Mapping	20
Educational Innovations and Challenges	17
Educational Leadership and Innovation	17
Technology-Enhanced Education Studies	17
Artificial Intelligence in Healthcare and Education	15
Intelligent Tutoring Systems and Adaptive Learning	12
Engineering Education and Technology	11
Ethics and Social Impacts of AI	10
Innovative Educational Technologies	10
Big Data and Business Intelligence	8
FinTech, Crowdfunding, Digital Finance	8
Digital Education and Society	8
AI in Service Interactions	6
Internet of Things and AI	5
Virtual Reality Applications and Impacts	4
Global Educational Policies and Reforms	4

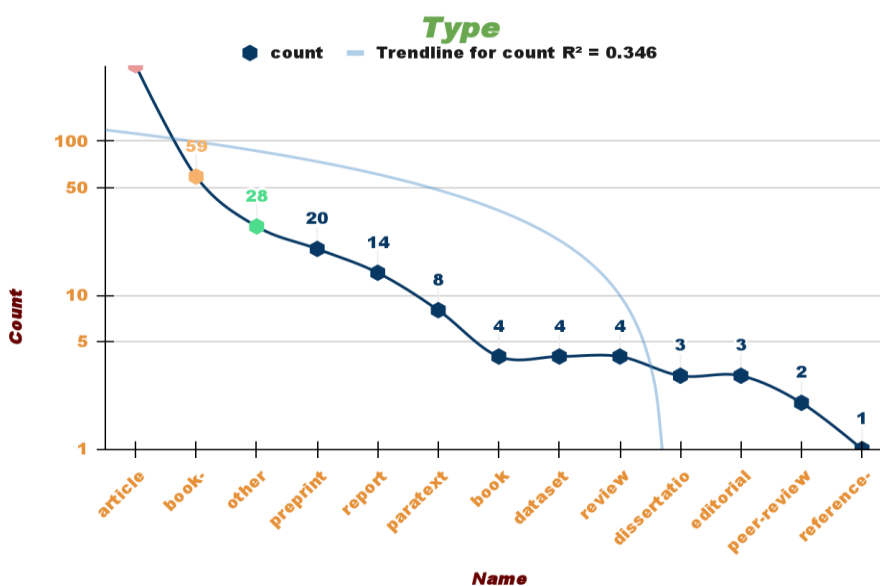
E-Learning and COVID-19	4
Online and Blended Learning	3
Higher Education Governance and Development	3
Digital Transformation in Industry	3
Behavioral and Psychological Studies	3
Explainable Artificial Intelligence (XAI)	3
Child Development and Digital Technology	3
Education during COVID-19 pandemic	3
Innovations and Analysis in Business and Education	3
Genetics, Bioinformatics, and Biomedical Research	3
Foreign Language Teaching Methods	3
Organizational and Employee Performance	3
E-Learning and Knowledge Management	3
Impact of AI and Big Data on Business and Society	3
Magnetic confinement fusion research	2
Teaching and Learning Programming	2
Innovative Teaching and Learning Methods	2
Educational Games and Gamification	2
Geographic Information Systems Studies	2
Diverse Music Education Insights	2
Smart Cities and Technologies	2
Maritime Navigation and Safety	2
Complex Systems and Decision Making	2
Supply Chain Resilience and Risk Management	2
Accounting Education and Careers	2
Educational Innovations and Technology	2
Economic and Technological Developments in Russia	2
Innovation and Socioeconomic Development	2
Legal and Social Justice Studies	2
Digital Transformation in Financial Services	2
Economic Development and Digital Transformation	2
Education and Learning Interventions	2
Higher Education Learning Practices	2
Economic Growth and Development	2
Educational Technology and Assessment	2
Psychological and Educational Research Studies	2

Diverse Interdisciplinary Research Innovations	2
Artificial Intelligence in Education	2
Entrepreneurship Studies and Influences	1
Technology Adoption and User Behaviour	1
SARS-CoV-2 and COVID-19 Research	1
COVID-19 and Mental Health	1
Genomics and Chromatin Dynamics	1
Innovations in Medical Education	1
Blockchain Technology Applications and Security	1
IoT and Edge/Fog Computing	1
Impact of Technology on Adolescents	1
Fuel Cells and Related Materials	1
Income, Poverty, and Inequality	1
Plant Virus Research Studies	1
Fungal and yeast genetics research	1
Social Media and Politics	1
Ethics in Clinical Research	1
Quantum Computing Algorithms and Architecture	1
Social Robot Interaction and HRI	1
Political Philosophy and Ethics	1
Career Development and Diversity	1
Forensic and Genetic Research	1
Privacy-Preserving Technologies in Data	1
Species Distribution and Climate Change	1
Environmental Education and Sustainability	1
Telomeres, Telomerase, and Senescence	1
Prenatal Screening and Diagnostics	1
Fungal Infections and Studies	1
Privacy, Security, and Data Protection	1
Online Learning Methods and Innovations	1
Language, Metaphor, and Cognition	1
Botulinum Toxin and Related Neurological Disorders	1
Energy and Environment Impacts	1
Mobile Learning in Education	1
ICT Impact and Policies	1

Digital Mental Health Interventions	1
Innovative Teaching Methods	1
Consumer Retail Behavior Studies	1
Information Technology Governance and Strategy	1
Tree-ring climate responses	1
Mobile Crowdsensing and Crowdsourcing	1
Education and Critical Thinking Development	1
Higher Education and Employability	1
Sustainability in Higher Education	1
Lipid metabolism and biosynthesis	1
Electromagnetic Compatibility and Measurements	1
Embodied and Extended Cognition	1
Research Data Management Practices	1
Impact of Light on Environment and Health	1
Evolutionary Algorithms and Applications	1
Advanced Frequency and Time Standards	1
Social Media in Health Education	1
Public Health Policies and Education	1
Software System Performance and Reliability	1
Evolution and Science Education	1
Educational Technology and Pedagogy	1
Hate Speech and Cyberbullying Detection	1
Fibroblast Growth Factor Research	1
Facial Nerve Paralysis Treatment and Research	1
Digital literacy in education	1
Innovations in Educational Methods	1
Digital Economy and Work Transformation	1
Botany and Plant Ecology Studies	1
Silymarin and Mushroom Poisoning	1
Educational Reforms and Innovations	1
Molecular spectroscopy and chirality	1
Legal Education and Practice Innovations	1
Space Science and Extraterrestrial Life	1
COVID-19 Digital Contact Tracing	1
Innovative Teaching Methodologies in Social Sciences	1
Transport and Logistics Innovations	1

Education and Islamic Studies	1
Digital Storytelling and Education	1
Business Strategies and Innovation	1
Economic Issues in Ukraine	1
Economic and Technological Systems Analysis	1
ICT in Developing Communities	1
Advanced Theoretical and Applied Studies in Material Sciences and Geometry	1
University-Industry-Government Innovation Models	1
Digitalization, Law, and Regulation	1
Robotics and Automated Systems	1
Regional Economic Development and Innovation	1
Business Strategy and Innovation	1
Labor Market and Education	1
Educational and Psychological Assessments	1
Publishing and Scholarly Communication	1
Education Systems and Policy	1
Calpain Protease Function and Regulation	1
Smart Systems and Machine Learning	1
Ergonomics and Human Factors	1
Diverse Approaches in Healthcare and Education Studies	1
AI and HR Technologies	1
Artificial Intelligence Applications	1
Blockchain Technology in Education and Learning	1
Legal, Health, Environmental and COVID-19 Challenges	1
Child Development and Education	1
Art, Technology, and Culture	1
Arabic Language Education Studies	1
Scientific Research and Technology	1
Banking Sector Performance and Management	1
Multidisciplinary Warburg-centric Studies	1
Emergency Medicine Education and Research	1
Education and Character Development	1
Education and Teacher Training	1
Technology and Data Analysis	1
Innovations in Education and Learning Technologies	1

4. Types of publications	
Name	Count
article	312
book-chapter	59
other	28
preprint	20
report	14
paratext	8
book	4
dataset	4
review	4
dissertation	3
editorial	3
peer-review	2
reference-entry	1



Major Research Themes in AI and EdTech:

Based on topic clustering and trends in recent literature, the following themes dominate the research landscape:

1. Personalized Learning Systems

AI algorithms enable adaptive learning systems that tailor educational content according to individual student needs, learning pace, and performance.

2. Intelligent Tutoring Systems

AI-powered tutoring systems provide automated feedback and guidance, simulating human tutoring processes.

3. Learning Analytics

AI tools analyse large educational datasets to predict student performance, identify learning gaps, and support academic decision-making.

4. Automated Assessment

Artificial intelligence enables automated grading systems, reducing educators' workload while maintaining evaluation accuracy.

5. AI-powered Virtual Learning Environments

AI integration in Learning Management Systems (LMS) enhances virtual classrooms, enabling interactive learning experiences.

Discussion:

The bibliometric analysis indicates a rapid expansion of research in the EdTech–AI domain. Several factors have contributed to this growth:

1. Digital Transformation in Education

Educational institutions worldwide are adopting digital learning platforms.

2. COVID-19 Pandemic Impact

The pandemic accelerated the adoption of online learning technologies.

3. Advancements in Artificial Intelligence

Developments in machine learning, natural language processing, and generative AI have significantly enhanced educational tools.

4. Policy Support and Investments

Governments and educational institutions are investing heavily in digital education initiatives.

The sharp rise in publications during 2025 suggests that AI-based education has become a major interdisciplinary research field.

Implications of the Study:

The findings have several implications:

For Researchers:

The study identifies emerging research areas that require further exploration, such as ethical AI in education and AI-driven curriculum design.

For Educational Institutions:

Universities can adopt AI-powered educational tools to enhance teaching efficiency and student learning outcomes.

For Policymakers:

The study highlights the importance of policies supporting digital learning infrastructure and AI integration in education.

Limitations of the Study:

Despite its contributions, the study has some limitations:

1. The analysis is based on a single database (OpenAlex).
2. Citation analysis and author collaboration networks were not included.
3. The study focuses mainly on publication trends rather than impact metrics.

Future research can incorporate multiple databases such as Scopus and Web of Science for a more comprehensive analysis.

Conclusion:

The bibliometric analysis demonstrates the rapidly growing academic interest in the intersection of Educational Technology and Artificial Intelligence. The number of publications has increased significantly, particularly after 2023, reflecting the expanding role of AI in modern education systems.

The study reveals that AI-driven personalized learning, intelligent tutoring systems, and learning analytics are among the most prominent research areas. As educational institutions continue to embrace digital transformation, AI-powered technologies will play a critical role in shaping the future of education.

Future research should focus on ethical considerations, digital inclusivity, and the long-term impact of AI-driven educational systems on teaching and learning outcomes.

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