MIER
Multicultural Islamic Education Review

REVIEW PAPER
E-ISSN: 3025-8839
Published Online: April 17, 2025
https://doi.org/10.23917/mier.v3i1.7319

Bibliometric Analysis of The Development Map and Direction of Contemporary Learning Research in The Scopus Database 1976-2024

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ABSTRACT

This study aims to analyze the development map and research direction related to Contemporary Learning through a bibliometric analysis method with a descriptive approach. Data was collected from the Scopus database in the 1976–2024 period using tools such as R, RStudio, VOS viewer, and Microsoft Excel. The results of the analysis show a significant increase in scientific publications since the early 2000s, with the largest surge occurring in the 2020–2024 period. The United States, the United Kingdom, and Australia were major contributors to the study, with universities such as Monash University leading academic publications. Core themes such as learning, curriculum, and e-learning are identified as key focuses, while subthemes such as machine learning and learning systems offer innovation potential for future research. The analysis of the keyword network highlights that technology-based learning, sustainability, and collaborative approaches play an important role in contemporary education. This study concludes that Contemporary Learning is a growing field with high relevance to digital transformation and global education challenges, providing opportunities for researchers to explore innovative themes that support the development of modern education.

ARTICLE HISTORY

Received: 03 January 2025
Revised: 08 April 2025
Accepted: 16 April 2024

KEYWORDS

Contemporary Learning; Bibliometric Analysis; Technology-Based Learning; Digital Transformation; Global Education Challenges.

INTRODUCTION

The change in the educational paradigm in the era of globalization and digitalization has made contemporary learning one of the main topics in educational research. This approach offers the integration of modern technology with pedagogical practices to answer the dynamic needs of 21st century learning [1]–[3]. Contemporary learning includes a variety of methods such as project-based learning, e-learning, adaptive learning, and microlearning, which are designed to increase flexibility, personalization, and learner engagement [4]–[6]. In this context, the need for a scientific evidence-based approach is growing to address complex global educational challenges.

Since its inception, contemporary learning has adopted digital technology as one of its key elements[7]. E-learning and hybrid learning, for example, have become effective strategies in maintaining educational continuity in the midst of emergency situations such as the COVID-19 pandemic [8]–[10]. In addition, technologies such as mobile apps and cloud-based platforms have enabled the delivery of more inclusive and collaborative learning materials, making them accessible to different groups of learners. This shows that contemporary learning is not only globally relevant but also contextual to local needs, including in Indonesia [11]–[14].

In recent decades, databases such as Scopus have recorded a significant increase in the number of publications related to contemporary learning, especially after 2000 [15]–[17]. This trend reflects the growing attention to the role of technology in the transformation of education [18]–[20]. For example, research shows that technology-based learning models not only support formal learning but also open up opportunities for lifelong learning. However,

although the number of publications continues to increase, systematic analysis is still needed to map the direction of research and find gaps that can be used as opportunities for further research.

The bibliometric approach offers a quantitative method for analyzing publication patterns and trends in research. This method allows the exploration of important aspects such as publication volume, citation rate, collaborative network between authors, and visualization of relationships between concepts. For example, bibliometrics can identify key themes such as competency-based learning, microlearning, or technological adaptation in pedagogy, which have been the focus of attention in the global literature.

Visualization tools such as VOSviewer have helped researchers in analyzing research networks more effectively. Through co-citation and keyword co-occurrence analysis, conceptual trends and future research directions can be identified more clearly. For example, research using bibliometrics shows that artificial intelligence technologies and learning analytics are starting to play an important role in supporting personalized learning. The tool also allows for the identification of key actors in research, including institutions, countries, and individuals with significant contributions in the field.

In Indonesia, the use of digital technology in learning has shown a significant impact. A study by Sari shows that hybrid learning and mobile learning models have become an effective solution during the pandemic, providing wider access to education even in remote areas. In addition, the adoption of microlearning in higher education has shown success in increasing the flexibility of learning in the digital age [21]–[23]. This shows that the application of technology in contemporary learning not only creates a better learning experience but also supports equal access to education.

However, while these developments are promising, challenges such as technology access gaps, resistance to pedagogical changes, and limitations in digital infrastructure are still significant obstacles. In addition, the lack of a systematic mapping of the global literature on contemporary learning creates additional challenges in understanding the direction of this research as a whole [24]–[26]. Therefore, bibliometric analysis is needed to bridge this gap and provide in-depth insights into developments and opportunities in contemporary learning fields.

This article aims to present a bibliometric analysis of publications related to contemporary learning from 1976 to 2024 based on Scopus data. With this approach, this article not only maps research trends but also makes a significant contribution to the development of more inclusive and evidence-based education strategies. In addition, this article is expected to be a reference for researchers, educators, and policymakers in designing interventions relevant to the needs of 21st century learners.

LITERATURE REVIEW

Contemporary learning integrates real-world relevance, active student engagement, and technological tools to improve educational outcomes. One prominent approach is Contextual Teaching and Learning (CTL), which connects classroom material to students' real-life experiences. Studies have shown that CTL significantly enhances students' academic achievement compared to traditional methods [20]. For instance, in science classes, CTL improved learning outcomes and classroom engagement. The use of video as a learning medium is also central to contemporary pedagogy. Video-based learning, especially those addressing real-life social issues, has been proven effective in fostering critical thinking and improving student motivation and understanding [2].

In mathematics education, contextual and realistic learning models such as the Karisma model and realistic mathematics education have been successful in enhancing both academic performance and student character development [17]. For preservice teachers, especially in vocational contexts, combining Pedagogical Content Knowledge (PCK) with collaborative learning has improved their ability to design context-based instruction, although some foundational skills still require further development [14]. Additionally, innovative instructional

models such as the “Broadway” vocal expression model have been shown to enhance emotional expression, performance quality, and professional readiness in music education. contemporary learning models that emphasize contextual relevance, multimedia integration, collaboration, and creative expression have demonstrated significant positive impacts on student learning and engagement across various disciplines .

METHODOLOGY

This study uses a bibliometric analysis method with a descriptive approach [27]–[30]. Information is obtained through the Boolean search engine to search Scopus pages in the range from 1976 to 2024. The search was carried out on November 14, 2024 at 09:15. Researchers use tools such as R and RStudio, VosViewer, and Microsoft Excel to analyze citations, document content, and networking. The procedure refers to previous studies that used bibliometric analysis to produce thematic maps, such as studies in the fields of The Cultural Landscape and Heritage Studies [31]–[37]. In the first stage, the researcher conducts a literature review on related themes to ensure relevant research is conducted on bibliometric topics. A literature review is also useful for determining keywords that are appropriate and considered to represent the scope of the study [38], [39], [48]–[51], [40]–[47].

In the second stage, to get an idea of whether the research covers the minimum number required, the researcher will look at the number of publications that have been published. If there are hundreds of publications, e.g. more than 500, this number can be considered substantial enough to ensure that bibliometric analysis can be performed. However, if the number of published documents is only tens, then the research area is considered small, and the application of bibliometric analysis is not recommended because a limited-scale analysis will be less efficient. In such a situation, a more appropriate approach is a meta-analysis and systematic review of existing documents. At this stage, the researcher used the Boolean operator TITLE-ABS-KEY (learning AND contemporary) to conduct a search in Scopus which resulted in 706 documents. Furthermore, filtration was carried out with the Boolean operator TITLE-ABS-KEY (learning AND contemporary) AND (SUBJAREA, "SOCI") OR (SUBJAREA, "ARTS") AND (DOCTYPE, "ar") AND (LANGUAGE, "ENGLISH"), so that only documents were included in English and resulted in a final document of 419.

The third stage, analysis is carried out on the final document using Scopus Analyzer, R, and RStudio to find out the number of documents per year, documents based on journals, authors, affiliations, countries, and subjects/fields. Furthermore, document network analysis was carried out by reading visualizations through VOSviewer and Microsoft Excel data processing with the types of analysis of co-authorship (author collaboration), co-occurrence (co-occurrence of keywords), and bibliometric coupling (bibliometric grouping). In this study, co-authorship and co-occurrence were used to map the development of studies on the theme of Contemporary Learning publications. Meanwhile, bibliometric coupling is used to determine authorship trends through the most dominant network. This research procedure can be seen in the next image.

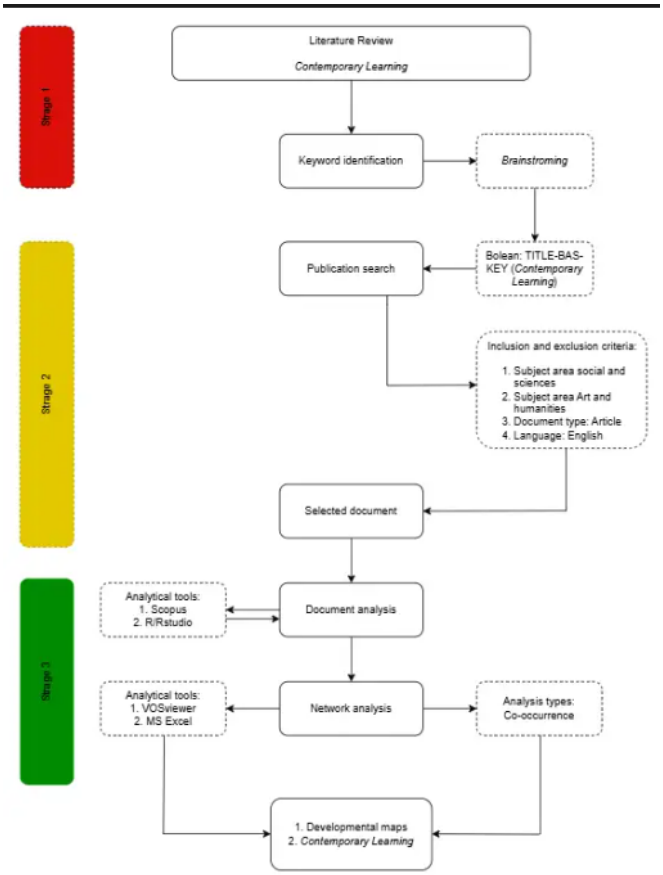

Figure 1. Research Flow

RESULTS AND DISCUSSION

Documents Analysis

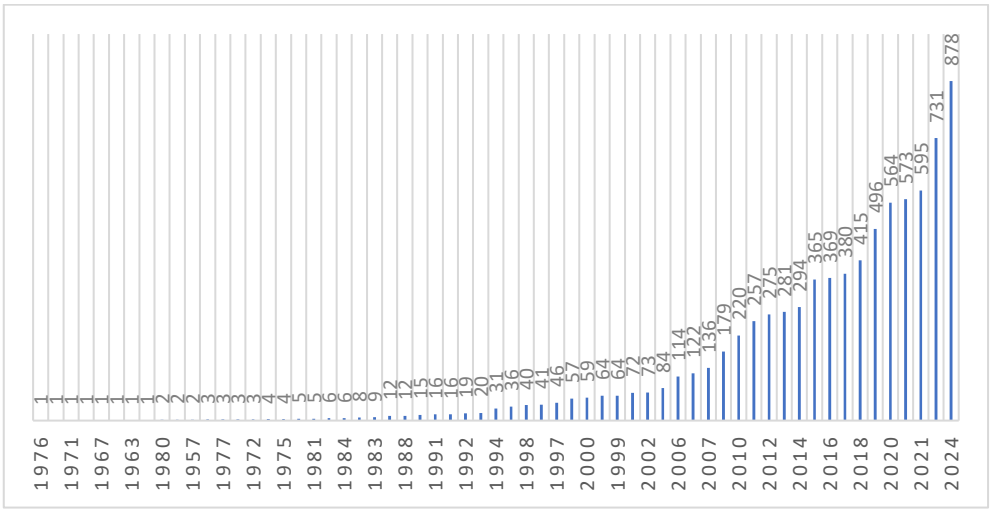

Figure 1. Results of Analysis of Contemporary Learning Publications by Year

Based on the data in the graph above, the development of the publication of scientific articles on Contemporary Learning shows a consistent upward trend from the initial publication to the last year analyzed. The most significant spike has occurred in recent years, especially between 2020 and 2024. Data shows that the number of publications

increased from just 1-3 articles per year in the early decade (1976-1990) to 878 articles in 2024, reflecting the tremendous increase in academic attention to this theme.

One of the key factors behind this surge is the growing global recognition of Contemporary Learning as an important field of study in the context of technological advancements and evolving learning methods. Education reforms and government initiatives, particularly in integrating innovative learning techniques, have supported this trend. The rapid acceleration after 2015 is in line with global efforts to adopt digital transformation in education, making this theme even more relevant and essential to research.

However, fluctuations in publication output in certain years, such as relatively slow growth in the early 2000s, indicate a period in which academic focus on this theme declined. These fluctuations are likely to be influenced by external factors such as changes in funding priorities or shifts in global academic interest. The significant surge during 2020-2024 reflects the urgency to address the challenges in education revealed during the COVID-19 pandemic, where the transition to online and hybrid learning is a top priority. This shows that research trends in Contemporary Learning are greatly influenced by global educational needs and technological advances.

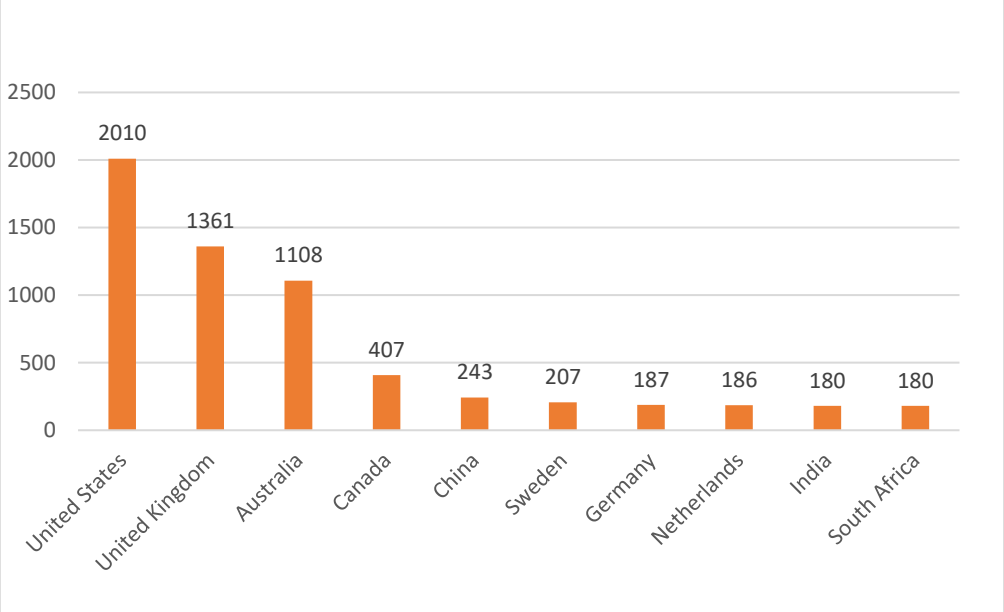

Figure 2. Results of Bibliometric Analysis of Countries Producing Scientific Works

Based on the chart above, the United States is the largest contributor with 2,010 documents. This dominance reflects the United States' position as a global academic and research center, supported by many prestigious universities, large research funds, and active collaboration between government, industry, and educational institutions. The high number of publications also shows significant attention to this theme in the context of policy, technology, and science development.

The UK came in second with 1,361 documents, reflecting the country's important role in encouraging international research. The UK is known for its strong tradition of collaboration, both at national and global levels, and its focus on sustainable educational innovation. Australia ranked third with 1,108 documents, which shows the significant contribution of the country, particularly in technology-based research and education, given the great attention to digital transformation in learning.

Furthermore, Canada with 407 documents has a considerable contribution, although it is lower than the previous three countries. Canada demonstrates excellence in sustainability-oriented research and community-based education. China, with 243 documents, stands out among Asian countries. This contribution is likely to be influenced

by government policies that support improving the quality of research and international collaboration, although most of the research is still domestic.

European countries such as Sweden (207 documents), Germany (187 documents), and the Netherlands (186 documents) show similar figures. These three countries have strong higher education systems and a tradition of collaborative research, although their volumes are smaller than those of the UK. India and South Africa, each with 180 documents, occupy the same position, reflecting the growing contribution of developing countries. In India, this increase is most likely driven by higher education reforms and a focus on information technology, while in South Africa, the contribution reflects the country's role as a research leader on the African continent.

Overall, this analysis confirms that research on this theme is dominated by developed countries, but there is growth potential from developing countries that are beginning to strengthen their contributions. This can be supported by increased global collaboration, better funding policies, and strengthening research infrastructure in these countries.

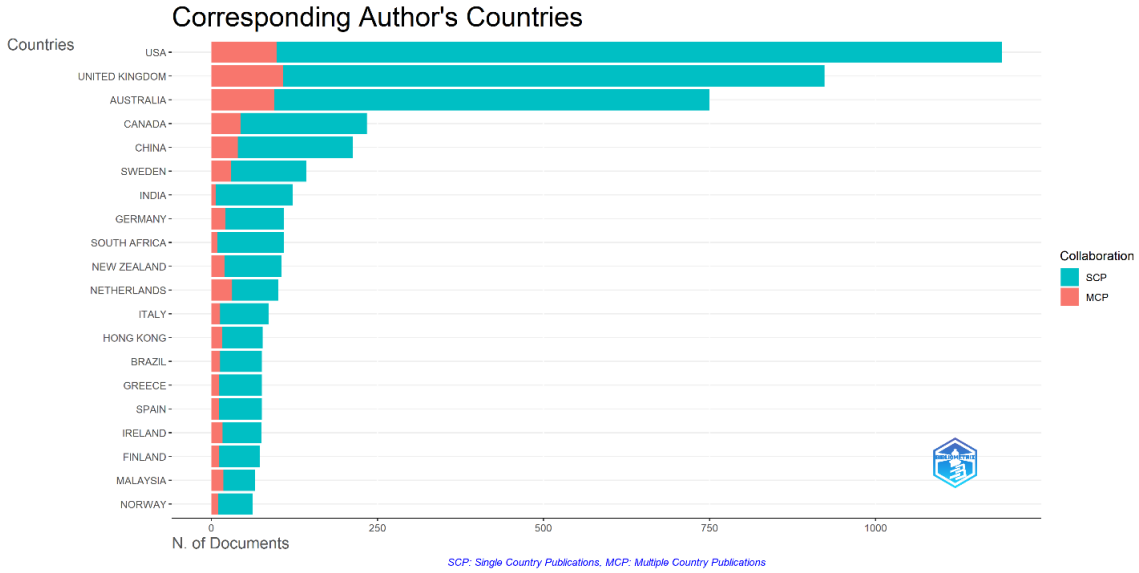

Figure 3. Publication Contributions by Country

Publication contributions by country show that the United States dominates with the highest number of documents compared to other countries. Most of the publications from the United States come from Single Country Publications (SCP), reflecting that research is done more domestically than through international collaborations. The UK and Australia are ranked second and third, with the UK showing a fairly high proportion of Multiple Country Publications (MCPs), signaling a strong culture of international collaboration. Meanwhile, Australia is more likely to follow a similar SCP pattern to the United States.

Other countries that also have significant contributions are Canada, China, and Sweden. Canada and Sweden show a good balance between SCP and MCP, reflecting the growing international collaboration. In contrast, China has a much larger predominance of SCPs than MCPs, indicating that research in the country is largely domestic. India, Germany, and Italy also have considerable publication contributions, with Germany standing out for its high MCP rate, demonstrating strong international collaboration capabilities. This places Germany as one of the countries with an active global research culture.

Countries with high levels of international collaboration, such as the UK, Germany, and Malaysia, stand out in the MCP pattern. The UK and Germany are supported by the presence of many global universities and research institutions, while Malaysia, despite having a smaller number of publications, shows a significant proportion of MCPs. Other European countries such as Italy, Spain, and the Netherlands have also shown strong MCP patterns, reflecting the importance of international collaboration in their research. With this pattern, countries dominated by SCPs, such as

China and the United States, are advised to study the collaboration models applied by countries with high MCPs to expand the impact of their research globally. Meanwhile, countries such as Canada, India, and Sweden can continue to encourage international collaboration while maintaining their domestic research strength.

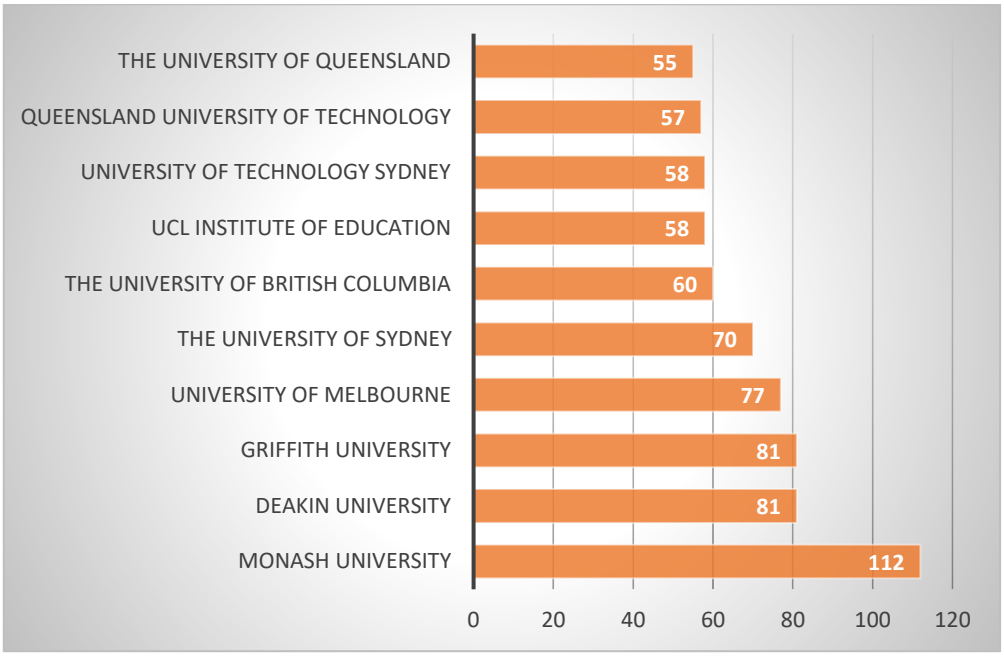

Figure 4. Results of Analysis Based on Author Affiliation

Based on the graph, Monash University became the institution with the highest publication contribution, reaching 112 documents. This demonstrates the university's important role in global research, supported by abundant resources, a strong research program, and extensive international collaborations. As one of Australia's leading universities, Monash University demonstrates a strong commitment to the development of science, particularly on the themes analyzed, leading the way in the number of publications.

Other institutions, such as Deakin University and Griffith University, each with 81 documents, show significant consistency in research contributions. This indicates a strong focus on today's needs-based educational and research innovations. The University of Melbourne and the University of Sydney, with 77 and 70 documents respectively, are also major players in producing publications. Both universities are known for their international reputations, both in teaching and research, which strengthens their position in the global academic scene.

International institutions such as the University of British Columbia (60 documents) and the UCL Institute of Education (58 documents) have also made significant contributions, confirming the relevance of this research theme at the global level. In addition, other Australian institutions, such as the University of Technology Sydney (58 documents), Queensland University of Technology (57 documents), and the University of Queensland (55 documents), complete the list of contributing institutions. Although their numbers are smaller, their contribution is still important in strengthening the research ecosystem. With this pattern, there is a concentration of research in large universities, especially in Australia, as well as opportunities for international collaboration to increase the impact of research more broadly.

This graph shows that the research themes analyzed have a fairly concentrated focus in Australia, with Monash University as the leader. Other institutions such as Deakin, Griffith and the University of Melbourne have made significant contributions, reflecting Australia's strong tradition of research. The presence of international institutions such as the University of British Columbia and the UCL Institute of Education signals the relevance of this theme in a global context, opening up opportunities for further collaboration to expand the impact of research. It also provides

insight that institutions with smaller contributions can increase their participation through a collaborative approach with more productive institutions.

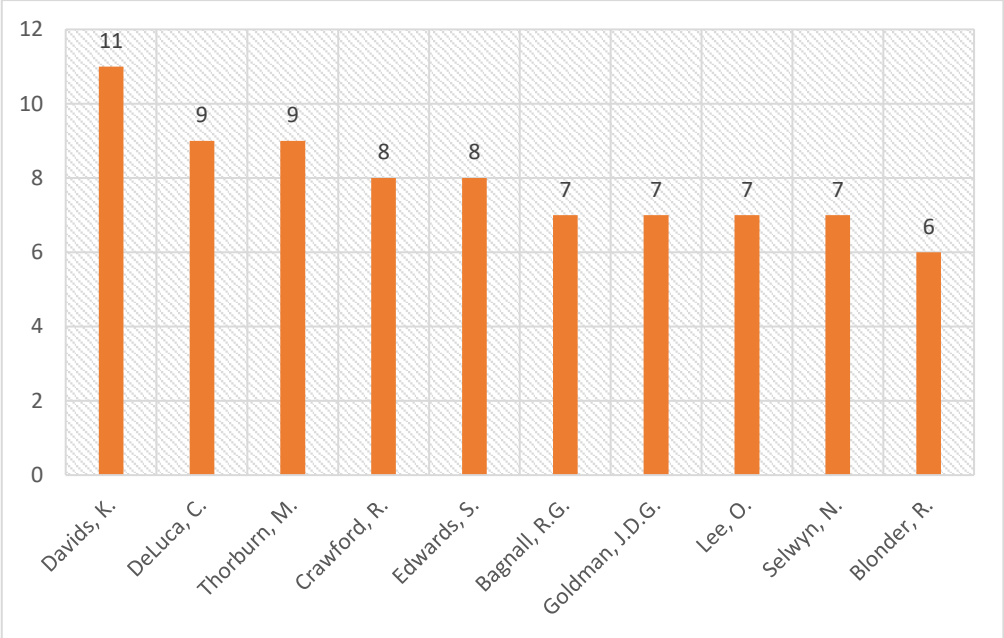

Figure 5. Results of Analysis Based on Authors

The graph shows the results of the bibliometric analysis of the author's contribution to scientific publications related to the theme of Contemporary Learning. Davids, K. It is ranked top with 11 publications, making it the most prolific writer in this subject. Davids, K.'s contributions demonstrate his significant role in building theoretical and practical foundations in this field, as well as his ability to produce relevant and influential research.

The next author, DeLuca, C. and Thorburn, M., each with 9 publications, is also an important figure who has consistently contributed to the development of Contemporary Learning. Crawford, R. being in a similar position, shows a significant role in exploring this topic, in particular perhaps in technology-based education or modern pedagogy. Writers such as Edwards, S. and Bagnall, R.G., each with 8 publications, has made an important contribution to the literature on this theme, which is likely to focus on the innovation or transformation of contemporary learning systems.

Other authors such as Goldman, J.D.G., Lee, O., and Selwyn, N., each has 7 publications, while Blonder, R. contributed 6 publications. Although their contribution is lower, these works still have an important impact, especially on more specific subthemes within Contemporary Learning. This pattern shows that there is a group of productive writers who are the driving force of research in this field, focusing on various aspects, such as educational technology, innovative pedagogy, and digital-based learning.

Table 1. Authors Who Have a Major Impact on Writing Articles on Contemporer learning

Author	H_Index	G_Index	M_Index	Tc	Py_Start
Crawford R	7	9	0,438	138	2009
Davids K	7	11	1,167	157	2019
Jr	7	16	0,194	700	1989
Boud D	6	6	0,667	328	2016
Coates H	6	6	0,429	101	2011

Deluca C	6	9	0,75	117	2017
Edwards R	6	6	0,2	143	1995
Edwards S	6	8	0,4	256	2010

Based on the analysis of author productivity and impact, Jr became the author with the most significant contribution, having a h_index of 7 and g_index 16, which shows 7 articles with a minimum of 7 citations as well as a high citation distribution on some of his articles. Jr also recorded the highest Total Citations (TC) of 700, confirming his significant impact in literature over a long period of time since he began actively writing in 1989. Meanwhile, Davids K, who started his publication in 2019, showed very rapid growth with a m_index of 1,167 and a TC of 157 in a relatively short time, making him one of the best-performing authors among the new generation.

In terms of relevance based on citations, Jr remains prominent as the author with the highest TC, reflecting his long-term influence. In contrast, Crawford R has a TC of 138 from 9 publications, which shows a more even impact across his works. Other authors such as Edwards S recorded TC 256 out of 8 publications, showing great contributions in specific relevant topics. In the publication trend, Davids K and Deluca C emerged as new active authors with high productivity. Deluca C, who started writing in 2017, has a m_index of 0.75, indicating that although it is new, it makes a solid contribution. Older authors such as Jr and Edwards R continue to maintain a steady impact in the literature, although their m_index are lower, at 0.194 and 0.2, respectively.

In m_index comparison, Davids K has the highest number at 1,167, indicating high efficiency in generating citations in a short time. Deluca C also stands out with a m_index of 0.75, reflecting good quote growth despite its shorter uptime. In contrast, Jr has a m_index of 0.194, which is lower, but still shows a significant contribution in the long term. Based on this analysis, authors such as Jr and Davids K deserve to be prime references due to their great contributions and impact. New active authors such as Davids K and Deluca C point to a growing trend of research and high citation efficiency, so it is important to follow.

The recommendation for institutions or libraries is to prioritize literature from authors with high h_index and m_index , such as Davids K and Deluca C, to provide access to relevant, high-quality resources. These authors not only show high productivity but also contribute greatly to the development of research in their field. Thus, research and resource management can be optimized to support emerging research trends.

Table 2. Distribution of Author Productivity Based on Lotka's Law

Documents written	N. of Authors	Proportion of Authors
1	15039	0,912
2	1093	0,066
3	223	0,014
4	74	0,004

The distribution of writers' productivity in the theme of Contemporary Learning based on Lotka's Law shows that the majority of authors have low productivity. About 91.2% of authors produced only one document, which reflects that the literature contribution on this theme comes mostly from non-regular authors or who are only involved in one publication. This is in accordance with the basic principle of Lotka's Law, which states that most contributions in literature are produced by authors with minimal involvement. A total of 6.6% of authors produced two documents, indicating better consistency despite remaining in the medium productivity category. Meanwhile, only 0.4% of authors

were able to produce four or more documents, making them part of a productive group considered to be core contributors or experts in the field.

This distribution pattern has important implications for the development of research in the field of Contemporary Learning. High-productivity writers deserve further attention because they are most likely the main figures shaping trends and innovations in this theme. The articles produced by this group can be an important reference for understanding the direction of research and theoretical development. Meanwhile, the majority of authors who produce only one document need specific strategies to increase their involvement in research, for example through training programs or academic collaborations.

In addition, this pattern suggests that most of the literature contributions in the field of Contemporary Learning depend on a small group of prolific writers. Therefore, further research needs to focus on the influence of this group on the development of the theme, while encouraging more participation from other authors to expand the scope and diversity of the literature. With this approach, Contemporary Learning literature can develop more strongly and relevant in facing the challenges of modern education.

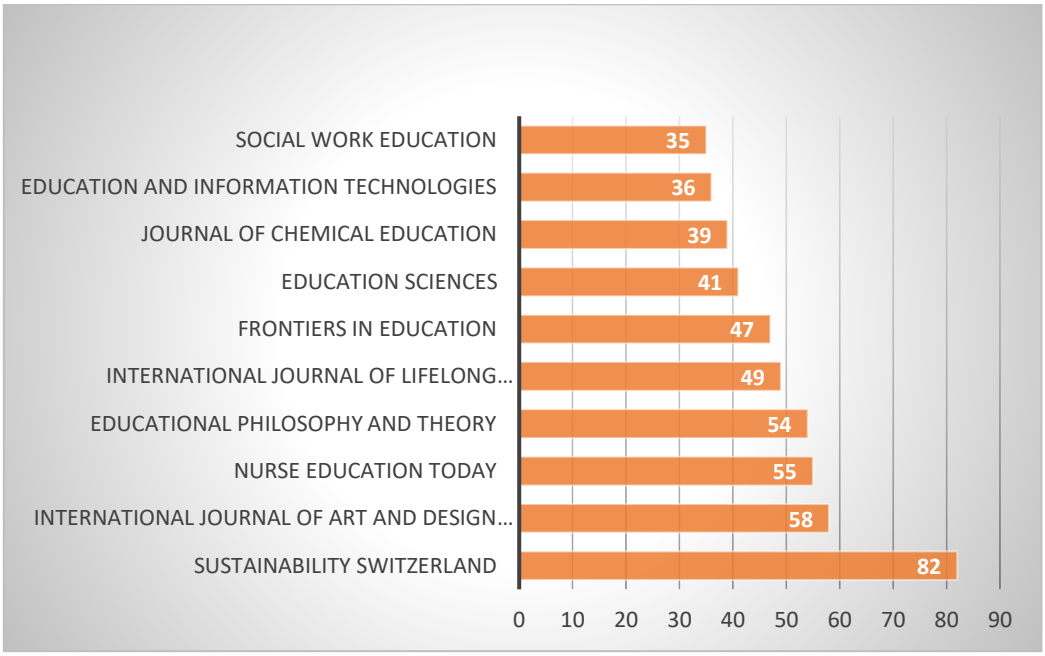

Table 6. Document Analysis Based on Source

The graph above shows the distribution of publications in the theme of Contemporary Learning based on journal contributions. Sustainability (Switzerland) occupies the top spot with 82 publications, reflecting the journal's focus on sustainability aspects in contemporary learning. Sustainability in education has become a major concern in the face of global challenges, such as climate change and the need for sustainable learning, so the high number of publications in this journal shows the close relationship between sustainability topics and contemporary learning. Other journals that contributed significantly were the International Journal of Art and Design Education with 58 publications, which highlighted the integration of art and design in modern learning, and Nurse Education Today with 55 publications, which showed interest in contemporary learning methods in nursing.

Journals such as Educational Philosophy and Theory (54 publications) and the International Journal of Lifelong Education (49 publications) make a major contribution to discussing the philosophy and approach of lifelong learning, which are particularly relevant to the evolving needs of education. In addition, Frontiers in Education (47 publications), Education Sciences (41 publications), and Journal of Chemical Education (39 publications) highlight the role of technology, science, and research-based approaches in the context of contemporary learning. The Journal of Education and Information Technologies with 36 publications emphasizes the importance of technology integration in

modern learning, while Social Work Education (35 publications) shows the relevance of contemporary learning in a social context.

Based on this analysis, several important implications can be drawn. Sustainability (Switzerland) is the leading journal for studies that integrate contemporary learning with sustainability issues, making it an important source of reference for understanding global trends in education. In addition, journals such as Nurse Education Today and the International Journal of Art and Design Education demonstrate a diversification of thematic approaches, which expand the scope of contemporary learning to specific fields. This shows the importance of cross-disciplinary collaboration in educational research. The role of journals such as Education and Information Technologies and Education Sciences emphasizes that technology is an essential element in modern learning, so further research needs to explore how technology can be applied innovatively in education. Therefore, researchers who want to understand the current trends in Contemporary Learning are advised to prioritize these high-contribution journals, while expanding their references to fields such as art, technology, nursing, and science to enrich their research perspectives.

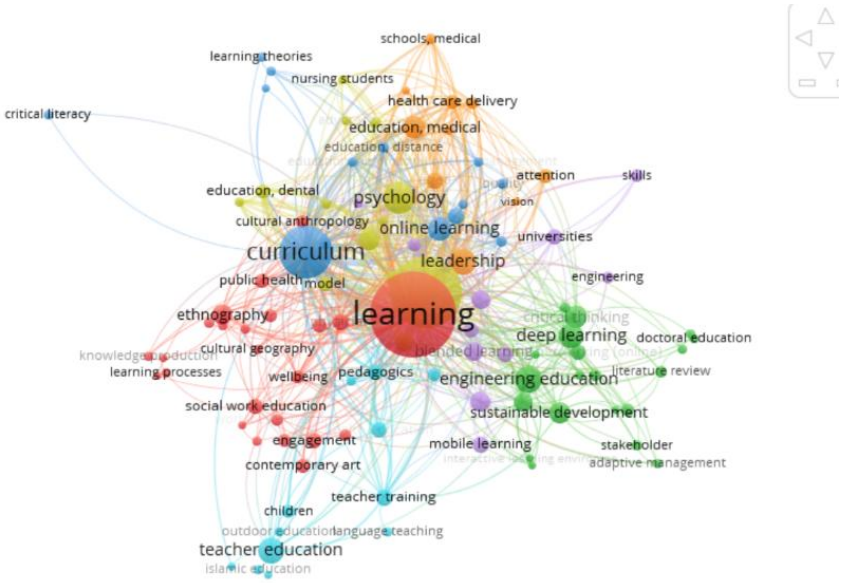

Figure 7. Keyword Network Distribution Based on Occurrence

Based on the analysis of the keyword network, the term “learning” is at the center of the network and shows a very strong connection with various other concepts, making it the core of the theme of Contemporary Learning. This term is closely related to keywords such as “curriculum”, “online learning”, “psychology”, and “teacher education”, which reflects the broad scope of this theme ranging from curriculum development, online education, to the influence of psychology in modern learning. In addition, keywords such as “deep learning”, “engineering education”, and “sustainable development” point to the integration of technology and sustainability as important elements in contemporary learning. “Online learning” and “mobile learning” highlight the role of digital innovation in improving the accessibility of education, which is increasingly relevant in the era of digital transformation.

Other keywords such as “leadership”, “blended learning”, and “adaptive management” describe the need for flexible leadership and management that is responsive to changes in the learning environment. “Teacher training” has also emerged as an important element, emphasizing the need for teacher skill development to support the implementation of modern learning. The cognitive and socio-cultural approach is also reflected in keywords such as “critical thinking” and “ethnography”, which shows that Contemporary Learning focuses not only on technology, but also on social and reflective elements.

This network shows that Contemporary Learning is a complex and multidimensional theme, covering technological, social, cultural, and psychological aspects. Therefore, research in this area can prioritize topics such as online

learning, deep learning, and curriculum, which have broad connections and high relevance in the network. In addition, focusing on the integration of technologies such as mobile learning and adaptive management can increase the flexibility and effectiveness of learning. Research that explores the connections between sustainability, teacher development, and a multidisciplinary approach will enrich insights and have a significant impact on contemporary education.

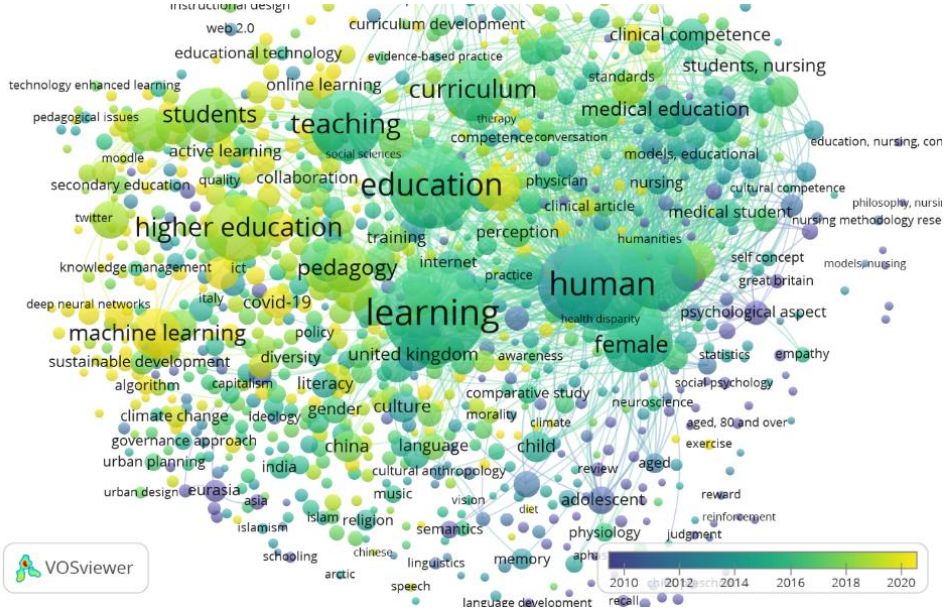

Figure 8. Keyword Network Distribution Based on Overlay

The visualization of the keyword network on the theme of Contemporary Learning provides a comprehensive overview of research dynamics based on size, color, and connection between keywords. The size of the circle in the image reflects the frequency of keyword occurrence, with terms such as learning, education, curriculum, teaching, and human having the largest circle, suggesting that this theme is at the heart of research in contemporary learning. These themes represent the main focus of the research, ranging from curriculum development, teaching approaches, to human relationships in the context of learning. In contrast, smaller spheres, such as machine learning, online learning, and social psychology, show more specific but nonetheless significant sub-themes for in-depth exploration.

The color of the circle indicates the temporal dimension, with a gradient from purple (the original theme) to yellow (the latest theme). Themes in purple, which dominated in the early 2000s, such as pedagogical issues and governance, reflect a focus on fundamental research and education policy. The color green, which dominated between 2010–2018, highlights themes such as higher education, collaboration, and curriculum development, reflecting a shift towards higher education development and institutional collaboration. Themes in yellow, which emerged after 2019, such as online learning, machine learning, and educational technology, illustrate the latest focus on modern technology and online learning, especially in response to the COVID-19 pandemic.

In addition, the connections between spheres reflect the relationships between themes. Core keywords such as learning and education have very strong connections with various other themes, affirming their central role in contemporary learning literature. In contrast, themes such as machine learning and climate change show a growing connection, signaling increased relevance. Meanwhile, themes such as cultural competence or neuroscience have weaker connections, reflecting more limited relevance to specific contexts.

Overall, this visualization shows how research on the theme of Contemporary Learning has evolved from a focus on fundamental issues to the adoption of advanced technologies and responses to global challenges. Core themes such as learning and education remain the main focus of research, while themes such as online learning and machine

learning have stood out as major concerns in recent years. This trend reflects the adaptation of academic literature to the dynamic needs of global education and innovations in learning methods.

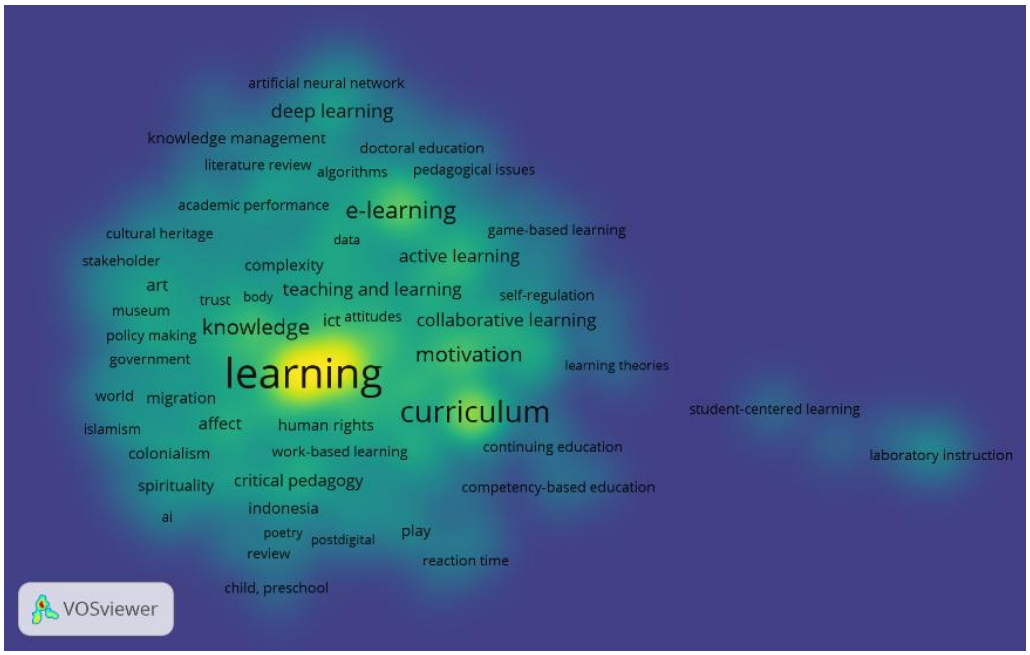

Figure 9. Keyword Network Distribution Based on Density

The visualization of the keyword network shows that the term "learning" is central to the theme of Contemporary Learning with a close relationship to various other important concepts. Terms such as "curriculum", "e-learning", "teaching and learning", and "knowledge" indicate that contemporary learning encompasses a wide range of aspects, from curriculum development, technology integration, to knowledge management. The focus on modern learning methods can be seen from the existence of keywords such as "active learning", "collaborative learning", and "student-centered learning", which emphasize an interactive, collaborative, and individual needs-based approach.

In addition, advanced technologies such as "deep learning" and "artificial neural networks" are emerging as an important part of Contemporary Learning, demonstrating how artificial intelligence and data analysis play a role in creating more adaptive learning methods. Social and psychological concepts such as "critical pedagogy", "motivation", and "work-based learning" enrich the learning perspective by highlighting the importance of work experience and individual motivation in educational success. The terms "competency-based education" and "continuing education" reflect the need to ensure lifelong learning that is relevant to the needs of the world of work and global development.

The network also demonstrates the importance of policy and management, as indicated by the keywords "policy making" and "knowledge management", to support the implementation of contemporary learning at large. With a focus on personalization, collaboration, and innovation, the theme of Contemporary Learning includes a multidisciplinary approach that integrates technology, psychology, and pedagogy. Further research can explore the connections between these elements to create more relevant, inclusive, and adaptive educational solutions in meeting the needs of modern individuals and society.

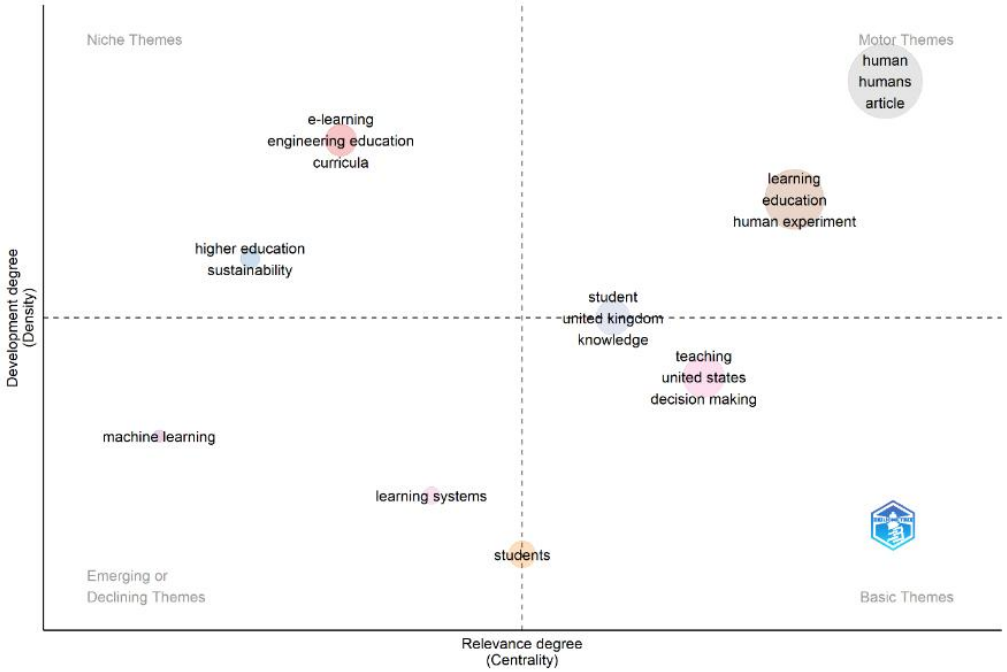

Figure 10. Theme quadrant

Based on the visualization of theme quadrants in Contemporary Learning, there are four main classifications that reflect the level of relevance and development of themes in this study: Basic Themes, Emerging or Declining Themes, Niche Themes, and Motor Themes. The Basic Themes quadrant, located at the bottom right, includes themes such as student, United Kingdom, knowledge, teaching, United States, and decision making. These themes are considered as relevant research foundations for building conceptual frameworks. While important as a foundation, the theme is still underdeveloped in terms of structure and depth of research, making it suitable for early exploration or as a springboard for the development of more complex themes.

In the bottom left quadrant, Emerging or Declining Themes includes themes such as machine learning and learning systems. These themes show lower relevance and are still in the early stages of development. Themes like this have the potential to increase in the future or, conversely, experience a decline in popularity. Research on this theme can open up opportunities for new innovations, especially in integrating technology with contemporary learning. Meanwhile, Niche Themes in the upper left quadrant includes themes such as e-learning, engineering education, and curricula. These themes have a good structure and deep relevance to a particular sub-field, making them suitable for technical research or specific exploration, for example in technology-based education or engineering curriculum development.

The Motor Themes Quadrant, located at the top right, includes themes such as learning, education, and human experiment. These themes are highly relevant and have undergone good development, making them the core of the Contemporary Learning literature. Research that focuses on these themes can have a significant impact, as it covers key aspects of modern learning. For example, learning and education reflect the core of contemporary learning, while human experiment opens up opportunities for further exploration in experiment-based pedagogy.

Overall, researchers are advised to start their research from Basic Themes, such as teaching and knowledge, before moving on to more complex themes. In addition, themes from the Emerging or Declining quadrant such as machine learning can be further explored to create innovation opportunities. For specific research, Niche Themes such as e-learning and curricula can provide in-depth insights into specific fields, while focusing on Motor Themes such as learning and education can make a major contribution to the development of Contemporary Learning literature. This quadrant helps map research priorities according to the purpose and

relevance of the theme, while also providing guidance to generate greater impact in contemporary educational literature.

CONCLUSION

Bibliometric analysis on the theme of Contemporary Learning shows a significant increase in scientific publications from the beginning of 1976 to 2024. This trend reflects the global attention to innovation in education, especially triggered by technological developments and the need for learning methods relevant to the digital age. The surge in publications is seen especially after 2020, pointing to the large role of adaptation to global challenges, such as the COVID-19 pandemic, which accelerated the transformation of online and hybrid learning. The United States dominates research contributions, with the United Kingdom and Australia following as countries with a strong tradition of academic collaboration. Analysis-based affiliation shows that leading universities, such as Monash University, lead in producing high-quality research. Authors such as Davids K and Jr. became major figures who made significant contributions to literature, while a productivity analysis based on Lotka's Law highlighted that most of the contributions came from a small group of productive writers.

Analysis, based on keywords and thematic quadrants, confirms that learning is at the heart of this theme, closely connected to concepts such as curriculum, e-learning, and deep learning. Themes such as machine learning and learning systems in the Emerging or Declining quadrant show potential for innovation in the future, while Motor Themes such as learning and education have developed well and have a significant impact. Future research is suggested to leverage these findings, either to explore specific themes such as teacher education or to prioritize core themes that are relevant to the needs of global contemporary education.

Acknowledgements

The authors gratefully acknowledge the support of all individuals and institutions who contributed insights and resources to this study, particularly in the fields of Islamic education.

Author Contribution

All authors contributed equally to the main contributor to this paper, some are as chairman, member, financier, article translator, and final editor. All authors read and approved the final paper.

Conflicts of Interest

All authors declare no conflict of interest.

REFERENCES

[1] J.-R. Sanabria-Navarro, Y. Silveira-Pérez, D.-D. Pérez-Bravo, and M. de-Jesús-Cortina-Núñez, “Incidences of artificial intelligence in contemporary education,” *Comunicar*, vol. 31, no. 77, 2023, https://doi.org/10.3916/C77-2023-08.

[2] A. Christopoulos, S. Mystakidis, E. Cachafeiro, and M.-J. Laakso, “Escaping the cell: virtual reality escape rooms in biology education,” *Behav. Inf. Technol.*, vol. 42, no. 9, pp. 1434–1451, 2023, https://doi.org/10.1080/0144929X.2022.2079560.

[3] M. J. Sousa, A. L. Marôco, S. P. Gonçalves, and A. B. Machado, “Digital Learning Is an Educational Format towards Sustainable Education,” *Sustain.*, vol. 14, no. 3, 2022, https://doi.org/10.3390/su14031140.

[4] R. K. M. Clube and M. Tennant, “Social inclusion and the circular economy: The case of a fashion textiles manufacturer in Vietnam,” *Bus. Strateg. Dev.*, vol. 5, no. 1, pp. 4–16, 2022, https://doi.org/10.1002/bsd2.179.

[5] D. Fortus, J. Lin, K. Neumann, and T. D. Sadler, “The role of affect in science literacy for all,” *Int. J. Sci. Educ.*, vol. 44, no. 4, pp. 535–555, 2022, https://doi.org/10.1080/09500693.2022.2036384.

[6] S. Modgil, R. K. Singh, and C. Hannibal, “Artificial intelligence for supply chain resilience: learning from Covid-19,” *Int. J.*

Logist. Manag., vol. 33, no. 4, pp. 1246–1268, 2022, https://doi.org/10.1108/IJLM-02-2021-0094.

[7] P. McLaren and E. Bosio, "Revolutionary critical pedagogy and critical global citizenship education: A conversation with Peter McLaren," *Citizsh. Teach. Learn.*, vol. 17, no. 2, pp. 165–181, 2022, https://doi.org/10.1386/ctl_00089_1.

[8] L.-V. Herm, K. Heinrich, J. Wanner, and C. Janiesch, "Stop ordering machine learning algorithms by their explainability! A user-centered investigation of performance and explainability," *Int. J. Inf. Manage.*, vol. 69, 2023, https://doi.org/10.1016/j.ijinfomgt.2022.102538.

[9] T. R. Morton, M. L. Miles, R. S. Roby, and N. A. Ortiz, "'All we Wanna do is be Free': Advocating for Black Liberation in and through K-12 Science Education," *J. Sci. Teacher Educ.*, vol. 33, no. 2, pp. 131–153, 2022, https://doi.org/10.1080/1046560X.2021.2008096.

[10] S. E. Kassab, D. Taylor, and H. Hamdy, "Student engagement in health professions education: AMEE Guide No. 152," *Med. Teach.*, vol. 45, no. 9, pp. 949–965, 2023, https://doi.org/10.1080/0142159X.2022.2137018.

[11] M. Brennan, E. Mayes, and L. Zipin, "The contemporary challenge of activism as curriculum work," *J. Educ. Adm. Hist.*, vol. 54, no. 3, pp. 319–333, 2022, https://doi.org/10.1080/00220620.2020.1866508.

[12] J. Mittleman, "Intersecting the Academic Gender Gap: The Education of Lesbian, Gay, and Bisexual America," *Am. Sociol. Rev.*, vol. 87, no. 2, pp. 303–335, 2022, https://doi.org/10.1177/00031224221075776.

[13] J. Zhou, E. Lam, C. H. Au, P. Lo, and D. K. W. Chiu, "Library café or elsewhere: usage of study space by different majors under contemporary technological environment," *Libr. Hi Tech*, vol. 40, no. 6, pp. 1567–1581, 2022, https://doi.org/10.1108/LHT-03-2021-0103.

[14] A. Mystkowska-Wiertelak, "Teachers' accounts of learners' engagement and disaffection in the language classroom," *Lang. Learn. J.*, vol. 50, no. 3, pp. 393–405, 2022, https://doi.org/10.1080/09571736.2020.1800067.

[15] K. Ali, N. Barhom, F. Tamimi, and M. Duggal, "ChatGPT—A double-edged sword for healthcare education? Implications for assessments of dental students," *Eur. J. Dent. Educ.*, vol. 28, no. 1, pp. 206–211, 2024, https://doi.org/10.1111/eje.12937.

[16] T. N. Y. Dang, S. Webb, and A. Coxhead, "Evaluating lists of high-frequency words: Teachers' and learners' perspectives," *Lang. Teach. Res.*, vol. 26, no. 4, pp. 617–641, 2022, https://doi.org/10.1177/1362168820911189.

[17] A. S. Al-Adwan, M. Nofal, H. Akram, N. A. Albelbisi, and M. Al-Okaily, "Towards A Sustainable Adoption Of E-Learning Systems: The Role Of Self-Directed Learning," *J. Inf. Technol. Educ. Res.*, vol. 21, pp. 245–267, 2022, https://doi.org/10.28945/4980.

[18] Y. Kang, S. Gao, and R. E. Roth, "Artificial intelligence studies in cartography: a review and synthesis of methods, applications, and ethics," *Cartogr. Geogr. Inf. Sci.*, vol. 51, no. 4, pp. 599–630, 2024, https://doi.org/10.1080/15230406.2023.2295943.

[19] M. Kumar, S. Singhal, S. Shekhar, B. Sharma, and G. Srivastava, "Optimized Stacking Ensemble Learning Model for Breast Cancer Detection and Classification Using Machine Learning," *Sustain.*, vol. 14, no. 21, 2022, https://doi.org/10.3390/su142113998.

[20] M. Sharma and S. Sharma, "A holistic approach to remote patient monitoring, fueled by ChatGPT and Metaverse technology: The future of nursing education," *Nurse Educ. Today*, vol. 131, 2023, https://doi.org/10.1016/j.nedt.2023.105972.

[21] S. Gronauer and K. Diepold, "Multi-agent deep reinforcement learning: a survey," *Artif. Intell. Rev.*, vol. 55, no. 2, pp. 895–943, 2022, https://doi.org/10.1007/s10462-021-09996-w.

[22] K. Xia *et al.*, "Privacy-Preserving Brain-Computer Interfaces: A Systematic Review," *IEEE Trans. Comput. Soc. Syst.*, vol. 10, no. 5, pp. 2312–2324, 2023, https://doi.org/10.1109/TCSS.2022.3184818.

[23] R. Olu-Ajayi, H. Alaka, I. Sulaimon, F. Sunmola, and S. Ajayi, "Machine learning for energy performance prediction at the design stage of buildings," *Energy Sustain. Dev.*, vol. 66, pp. 12–25, 2022, https://doi.org/10.1016/j.esd.2021.11.002.

[24] U. Mertens, B. Finn, and M. A. Lindner, "Effects of Computer-Based Feedback on Lower and Higher-Order Learning Outcomes: A Network Meta-Analysis," *J. Educ. Psychol.*, vol. 114, no. 8, pp. 1743–1772, 2022, https://doi.org/10.1037/edu0000764.

[25] T. Liu and M. Israel, "Uncovering students' problem-solving processes in game-based learning environments," *Comput. Educ.*, vol. 182, 2022, https://doi.org/10.1016/j.compedu.2022.104462.

[26] A. Macanovic, "Text mining for social science – The state and the future of computational text analysis in sociology," *Soc.*

Sci. Res., vol. 108, 2022, https://doi.org/10.1016/j.ssresearch.2022.102784.

[27] D. Guleria and G. Kaur, "Bibliometric analysis of ecopreneurship using VOSviewer and RStudio Bibliometrix, 1989–2019," *Libr. Hi Tech*, vol. 39, no. 4, pp. 1001–1024, 2021.

[28] T. Zhou, "Bibliometric analysis and visualization of online education in sports," *Cogent Soc. Sci.*, vol. 9, no. 1, 2023, https://doi.org/10.1080/23311886.2023.2167625.

[29] D. F. Costa, F. de Melo Carvalho, B. C. de Melo Moreira, and J. W. do Prado, "Bibliometric analysis on the association between behavioral finance and decision making with cognitive biases such as overconfidence, anchoring effect and confirmation bias," *Scientometrics*, vol. 111, no. 3, pp. 1775–1799, 2017, https://doi.org/10.1007/s11192-017-2371-5.

[30] R. Mutz and H.-D. Daniel, "The bibliometric quotient (BQ), or how to measure a researcher's performance capacity: A Bayesian Poisson Rasch model," *J. Informetr.*, vol. 12, no. 4, pp. 1282–1295, 2018, https://doi.org/10.1016/j.joi.2018.10.006.

[31] F. U. Al Mubarok, M. Z. Azani, H. Salim, M. N. R. Maksum, and M. S. Apriantoro, "Tracing the Progression of Motivated Learning Strategies: an In-Depth Bibliometric Analysis," *Proceeding ISETH (International Summit Sci. Technol. Humanit.*, pp. 450–460, Jan. 2024, https://doi.org/10.23917/iseth.3895.

[32] M. Y. R. Amien, M. N. R. Maksum, A. Anshori, and F. U. Al Mubarok, "Unveiling the Post-Pandemic Pedagogical Shift: A Bibliometric Odyssey into Educational Technology Research on the Scopus Database (2020-2023)," *Proceeding ISETH (International Summit Sci. Technol. Humanit.*, pp. 2922–2934, Jan. 2024, https://doi.org/10.23917/iseth.5448.

[33] Z. Chen, "Socioeconomic Impacts of high-speed rail: A bibliometric analysis," *Socioecon. Plann. Sci.*, vol. 85, 2023, https://doi.org/10.1016/j.seps.2022.101265.

[34] R. Mushtaq, O. Dastane, M. Rafiq, and B. D. Başar, "Women financial inclusion research: a bibliometric and network analysis," *Int. J. Soc. Econ.*, vol. 50, no. 8, pp. 1169–1185, 2023, https://doi.org/10.1108/IJSE-06-2022-0438.

[35] J. Crawley-Low, "Bibliometric analysis of the American Journal of Veterinary Research to produce a list of core veterinary medicine journals," *J. Med. Libr. Assoc.*, vol. 94, no. 4, pp. 430–434, 2006, https://www.scopus.com/inward/record.uri?eid=2-s2.0-33751549264&partnerID=40&md5=15dbdc5946d211b503ad54b4068130e0.

[36] T. N. Van Leeuwen, "Modelling of bibliometric approaches and importance of output verification in research performance assessment," *Res. Eval.*, vol. 16, no. 2, pp. 93–105, 2007, https://doi.org/10.3152/095820207X227529.

[37] V. Amarante, M. Brun, and C. Rossel, "Poverty and inequality in Latin America's research agenda: A bibliometric review," *Dev. Policy Rev.*, vol. 38, no. 4, pp. 465–482, 2020, https://doi.org/10.1111/dpr.12429.

[38] L. Yan and W. Zhiping, "Mapping the Literature on Academic Publishing: A Bibliometric Analysis on WOS," *SAGE Open*, vol. 13, no. 1, 2023, https://doi.org/10.1177/21582440231158562.

[39] D. Tal and A. Gordon, "Intellectual Leadership of Leonardo da Vinci: A Bibliometric Study," *Society*, vol. 55, no. 6, pp. 549–554, 2018, https://doi.org/10.1007/s12115-018-0307-1.

[40] S. Rousseau and R. Rousseau, "Being metric-wise: Heterogeneity in bibliometric knowledge," *Prof. la Inf.*, vol. 26, no. 3, pp. 480–487, 2017, https://doi.org/10.3145/epi.2017.may.14.

[41] P. Sebo and S. de Lucia, "Evaluation of the productivity of hospital-based researchers: comparative study between the h-index and the h(fa)-index," *Scientometrics*, vol. 126, no. 8, pp. 7087–7096, 2021, https://doi.org/10.1007/s11192-021-04040-8.

[42] B. Teleki, P. Sasvari, and A. Urbanovics, "Evaluating the scientific performance of researchers at the field of EU agencification from a bibliometric approach," *Adv. Bus. Relat. Sci. Res. J.*, vol. 12, no. 1, pp. 59–77, 2021, https://www.scopus.com/inward/record.uri?eid=2-s2.0-85116298494&partnerID=40&md5=e7dc34289ad6a68601b1488c5f0f6188.

[43] Y. Fassin, "Does the Financial Times FT50 journal list select the best management and economics journals?," *Scientometrics*, vol. 126, no. 7, pp. 5911–5943, 2021, https://doi.org/10.1007/s11192-021-03988-x.

[44] J. V. R. Luiz, D. Jugend, C. J. C. Jabbour, O. R. Luiz, and F. B. de Souza, "Ecodesign field of research throughout the world: mapping the territory by using an evolutionary lens," *Scientometrics*, vol. 109, no. 1, pp. 241–259, 2016, https://doi.org/10.1007/s11192-016-2043-x.

[45] V. Victor, A. M. Nair, and D. F. Meyer, "Nudges and choice architecture in public policy: A bibliometric analysis," *J. Behav.*

Exp. Econ. , vol. 104, 2023, https://doi.org/10.1016/j.socec.2023.102020.

[46] A. M. Bongale, R. Joshi, and K. Kadam, "Bibliometric Analysis of Fireflfly Algorithm Applications in the Field of Wireless Sensor Networks," *Libr. Philos. Pract.*, vol. 2020, pp. 1–22, 2020, https://www.scopus.com/inward/record.uri?eid=2-s2.0-85098183101&partnerID=40&md5=5027e142c9e1925fc8efacf3f45b1075.

[47] I. U. Haq and K. A. Fouzan, "Research in dentistry at Saudi Arabia: Analysis of citation impact," *Libr. Philos. Pract.*, vol. 2019, 2019, https://www.scopus.com/inward/record.uri?eid=2-s2.0-85072819708&partnerID=40&md5=d5e9089c5748f4dc6edaaa473fec0411.

[48] J. Kucera, A. N. Sedlackova, and A.-E. Negoianu, "Generative Artificial Intelligence-based Clinical Decision Support in Patient Data Collection and Analysis, in Physiological Parameter Monitoring, and in Image-based Disease Diagnosis," *Contemp. Readings Law Soc. Justice*, vol. 15, no. 1, pp. 116–133, 2023, https://doi.org/10.22381/CRLSJ15120237.

[49] M. Barrios, A. Borrego, A. Vilaginés, C. Ollé, and M. Somoza, "A bibliometric study of psychological research on tourism," *Scientometrics*, vol. 77, no. 3, pp. 453–467, 2008, https://doi.org/10.1007/s11192-007-1952-0.

[50] A. Nova-Reyes, F. Muñoz-Leiva, and T. Luque-Martínez, "The tipping point in the status of socially responsible consumer behavior research? A bibliometric analysis," *Sustain.*, vol. 12, no. 8, pp. 1–23, 2020, v.

[51] F. Sánchez, D. De Filippo, A. Blanco, and M. L. Lascurain, "Contribution of Social Psychology Research to the Sustainable Development Goals (SDGs). Bibliometric and Content Analysis of Spanish Publications," *Span. J. Psychol.*, vol. 25, no. 3, 2022, https://doi.org/10.1017/SJP.2022.18.