Bibliometric Analysis of Rhizomatic Learning in Educational Research

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ABSTRACT

This study presents a bibliometric analysis of scholarly literature on rhizomatic learning in educational research, aiming to uncover its intellectual structure, thematic developments, and collaborative patterns. Using data retrieved from the Scopus database (2008–2024) and analyzed with VOSviewer, the study visualizes co-citation networks, keyword co-occurrences, country collaborations, and temporal trends. The findings reveal that rhizomatic learning is conceptually grounded in poststructuralist philosophy, particularly the works of Gilles Deleuze and Félix Guattari, and is increasingly applied in digital pedagogy, professional development, and lifelong learning contexts. Central themes such as connectivism, new materialism, and multiplicity demonstrate the field's interdisciplinary depth, while emerging topics like sustainability and adult learning reflect its practical expansion. The research also highlights a concentration of scholarly output in Anglophone countries and a predominance of qualitative methodologies. This study contributes to a deeper understanding of rhizomatic learning's evolution and offers a foundation for future inquiry that bridges theory, practice, and global educational needs.
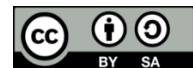
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1. INTRODUCTION

The evolution of pedagogical theories over the past few decades has challenged the dominance of traditional, linear models of learning. Among the emergent perspectives gaining attention in educational research is rhizomatic learning, a concept introduced by French philosophers [1] in their seminal work A Thousand Plateaus. Inspired by the botanical metaphor of the rhizome (a root system that grows horizontally in multiple directions) rhizomatic learning posits that knowledge is not hierarchical or linear, but rather nonlinear, interconnected, and ever-expanding. This contrasts starkly with conventional education models that assume a predetermined curriculum and fixed learning outcomes. In rhizomatic learning, the learner charts their own path through a knowledge landscape, connecting nodes of information based on relevance, interest, and context [2], [3].

The rise of digital technologies and online learning environments has provided fertile ground for rhizomatic learning to take

root. Massive Open Online Courses (MOOCs), social learning platforms, and peer-to-peer knowledge networks enable learners to self-direct their educational journeys. [2], who adapted Deleuze and Guattari's ideas to education, emphasized the need for educational frameworks that accommodate fluidity, decentralization, and learner autonomy. This aligns with contemporary shifts in education that stress constructivism, connectivism, and personalized learning pathways. Rhizomatic learning not only decentralizes the authority of the teacher but redefines curriculum itself as a dynamic, co-constructed entity.

Over the years, rhizomatic learning has been explored across diverse educational contexts from K-12 settings to higher education and professional development. Its application in digital pedagogy, in particular, has drawn scholarly attention for its capacity to promote creativity, critical thinking, and learner agency [4]. In educational research, rhizomatic learning is often linked to poststructuralist epistemologies that question standardized knowledge, linear progression, and universal truth claims. This makes it a compelling lens through which to examine inclusive, interdisciplinary, and emergent forms of learning. However, its conceptual ambiguity and theoretical novelty have also posed challenges for systematic exploration and empirical validation.

The growing scholarly interest in rhizomatic learning invites a closer examination of its intellectual structure, key contributors, thematic evolution, and interdisciplinary reach. Bibliometric analysis offers a powerful tool for mapping the landscape of academic discourse on this topic. By analyzing patterns of publication, citation, co-authorship, and keyword co-occurrence, researchers can uncover the development trajectory, research clusters, and influential works shaping the field. This method also aids in identifying gaps, emerging trends, and potential future directions for inquiry. Bibliometric approaches have been increasingly applied in educational research to analyze evolving domains such as learning analytics, gamification, and digital literacy [5].

Despite its increasing prominence in theoretical discussions, rhizomatic learning has yet to receive comprehensive bibliometric attention. While narrative reviews and conceptual analyses exist, there is a lack of empirical studies that systematically map the structure and dynamics of this research domain. Given its interdisciplinary nature and evolving theoretical foundation, a bibliometric investigation could offer valuable insights into how rhizomatic learning is situated within the broader field of educational research. It could also illuminate the interrelations between authors, journals, institutions, and topics that contribute to its academic development. Such an analysis would support scholars in understanding the intellectual roots, citation practices, and thematic directions of this field.

Although rhizomatic learning has emerged as an influential theory in educational discourse, the lack of a consolidated understanding of its research development presents a significant limitation for scholars and practitioners alike. The absence of a comprehensive bibliometric synthesis makes it difficult to track the evolution, impact, and diffusion of this concept across disciplines and educational settings. Without such mapping, research efforts may remain fragmented, leading to duplication, conceptual ambiguity, and underutilization of existing knowledge. Furthermore, the increasing volume of publications related to rhizomatic learning necessitates an evidence-based overview that goes beyond anecdotal or narrative approaches. This study aims to conduct a **bibliometric analysis of rhizomatic learning in educational research** in order to map its intellectual structure, identify influential authors and publications, detect emerging research themes, and explore the interdisciplinary connections within this body of literature.

2. METHOD

This study adopted a **quantitative bibliometric method** to analyze the structure and evolution of scholarly research on rhizomatic learning within educational contexts. Bibliometric analysis enables researchers to examine patterns in academic publishing and identify the intellectual foundations, key themes, and collaboration networks that define a specific research domain. To achieve these goals, this study utilized **VOSviewer**, a software tool specifically designed for constructing and visualizing bibliometric networks, including co-authorship, citation, bibliographic coupling, and co-occurrence of keywords [6]. VOSviewer was selected for its visual interface, clustering capabilities, and suitability for mapping conceptual and social structures in academic literature.

The bibliometric data were retrieved exclusively from the **Scopus database**, owing to its comprehensive coverage of high-quality publications across multiple disciplines. The search query used was: "rhizomatic learning"

OR "rhizome learning" in the title, abstract, and keyword fields, limited to the publication years **2008 to 2024**. This time range reflects the period beginning with Dave Cormier's introduction of rhizomatic learning into educational discourse. Document types were limited to peer-reviewed journal articles, conference papers, book chapters, and reviews published in English. After screening and removing duplicates or irrelevant entries, a final dataset of **598** documents was exported in .ris format and prepared for import into VOSviewer. The analysis in VOSviewer consisted of four main components. First, a **co-authorship analysis** was conducted to identify collaboration patterns among authors and institutions. Second, **citation analysis** was used to determine the most influential publications and authors based on total link strength and citation counts. Third, a **co-occurrence analysis of author keywords** was performed to reveal dominant research themes and emerging conceptual clusters.

3. RESULT AND DISCUSSION
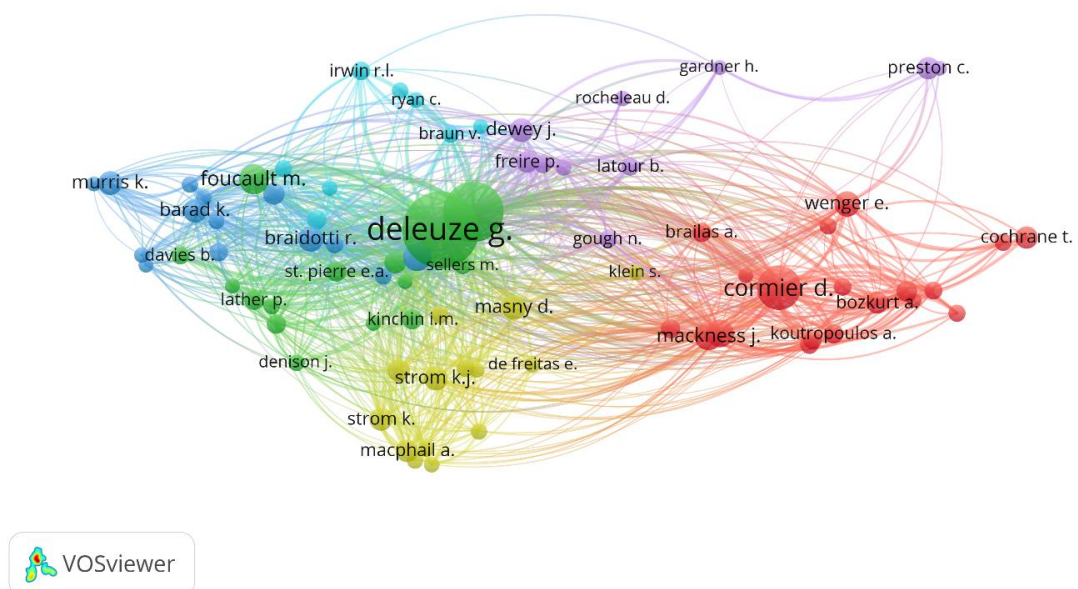
3.1 Co-Authorship Analysis

Figure 1. Author Visualization
Source: Data Analysis

Figure 1 presented above maps the **co-citation relationships** among

authors in the field of rhizomatic learning and related educational theories. The

graph reveals **six distinct clusters**, each color-coded to represent groups of authors who are frequently cited together. At the center of the visualization is **Gilles Deleuze**, a foundational figure in rhizomatic theory, forming the green cluster along with other poststructuralist scholars such as Braidotti, St. Pierre, and Foucault, indicating a strong philosophical underpinning. The red cluster is anchored by **Dave Cormier**, the educational theorist who adapted rhizomatic learning for pedagogy, alongside closely affiliated researchers like Mackness, Bozkurt, and Koutropoulos—highlighting a practical and digital learning application strand. Other clusters include scholars like Dewey, Freire, and Latour (purple), signaling critical pedagogy and sociomaterialist influences, while the blue and yellow clusters suggest adjacent themes in feminist theory, curriculum studies, and educational praxis.
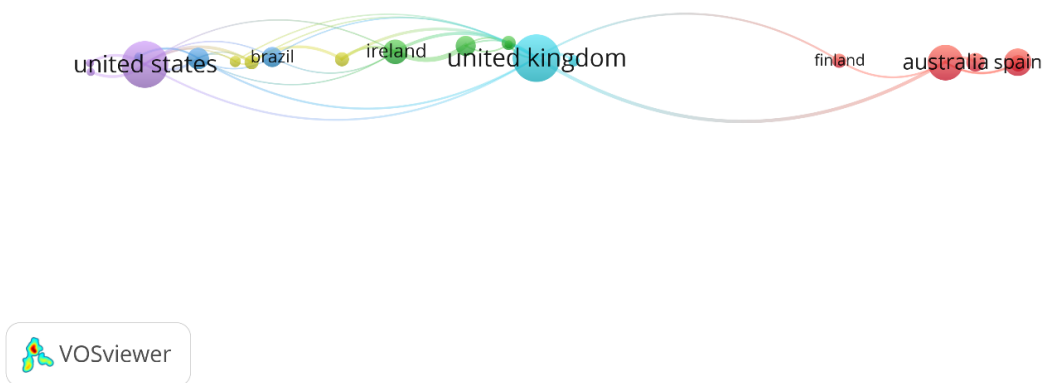

Figure 2. Country Visualization
Source: Data Analysis

Figure 2 is the **country-level co-authorship network** in rhizomatic learning research, highlighting international collaboration patterns. The **United Kingdom** emerges as the central node with the highest degree of connectivity, indicating its prominent role in publishing and partnering with other countries in this field. Strong links are visible between the UK and **United States**, **Ireland**, and **Australia**, suggesting active transatlantic and Anglophone scholarly collaboration. Other participating countries include **Brazil**, **Spain**, and **Finland**, forming smaller but notable clusters. The spatial distribution shows that rhizomatic learning research is primarily driven by institutions in **Western and English-speaking nations**, with limited but emerging contributions from countries in South America and continental Europe.

3.2 Citation Analysis

Table 1. Most Cited Article

Citations	Author and Year	Title
44	[7]	From places to paths: Learning for Sustainability, teacher education and a philosophy of becoming
41	[8]	A rhizomatic learning process to create collective knowledge in entrepreneurship education: Open innovation and collaboration beyond boundaries
38	[9]	Information and communication technologies (IT): Formative scenarios and learning theories

Citations	Author and Year	Title
37	[10]	Democratizing the flows of democracy: Patagonia sin represas in the awakening of Chile's civil society
36	[11]	Developing a pedagogy of teacher education using self-study: A rhizomatic examination of negotiating learning and practice
36	[12]	Community tracking in a cMOOc and nomadic learner behavior identification on a connectivist rhizomatic learning network
35	[13]	Rhizomatic mapping: spaces for learning in higher education
34	[14]	Service-learning within higher education: Rhizomatic interconnections between university and the real world
32	[15]	Governmentality-neoliberalism-education: The risk perspective
29	[16]	Negotiating the complexity of teaching: a rhizomatic consideration of pre-service teachers' school placement experiences

Source: Scopus, 2025

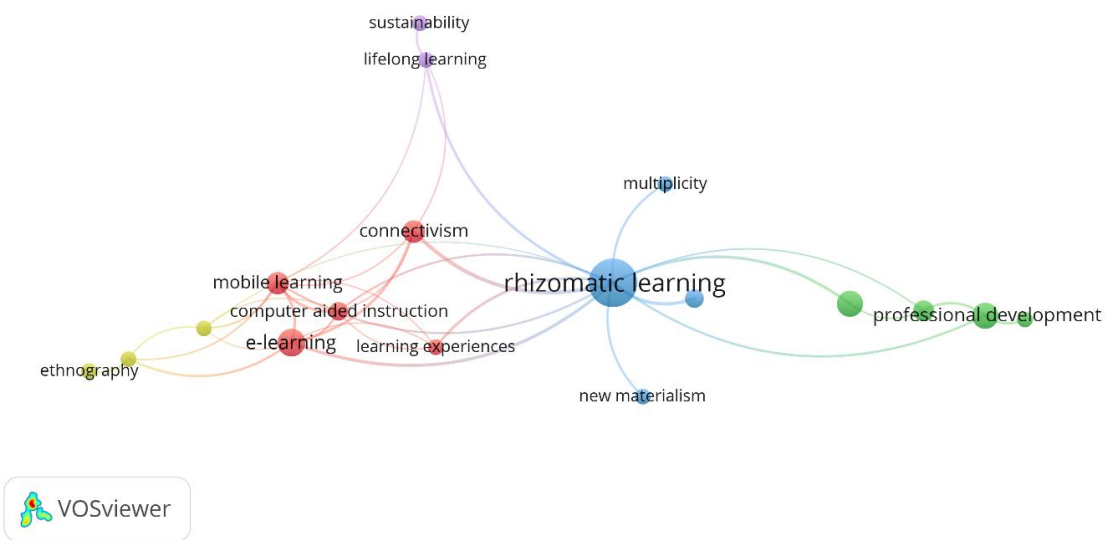### 3.3 Co-Occurrence Analysis

Figure 3. Network Visualization
Source: Data Analysis

Figure 3 shown above presents a thematic structure of the scholarly discourse on **rhizomatic learning**, revealing multiple interlinked clusters of concepts. At the center is the keyword **"rhizomatic learning"**, acting as the primary node that connects to various other educational concepts and philosophical themes. The size of the node indicates its frequency of appearance in the dataset, while the thickness of the lines (edges) and proximity between terms reflect the strength and frequency of their co-occurrence in the same documents. This visualization provides insight into the intellectual and thematic landscape of the field, showing how rhizomatic learning is positioned within broader discourses in educational research.

The **red cluster** groups together terms such as *connectivism*, *e-learning*, *mobile learning*, *computer-aided instruction*, and *learning experiences*. This cluster represents the **digital and technological pedagogy dimension** of rhizomatic learning. It highlights how scholars have associated rhizomatic learning with

online and mobile educational platforms, especially in contexts where learners self-navigate knowledge in decentralized environments. The link to *connectivism*—another theory rooted in networked learning—underscores a shared epistemological ground that values distributed knowledge, learner autonomy, and fluid connections in digital contexts.

To the **left**, the **yellow cluster**, with keywords like *ethnography*, suggests a **methodological angle** in the research, focusing on qualitative inquiry and contextual understanding. Ethnographic methods may be used to explore how learners engage with rhizomatic environments in real-world settings, capturing the complexity and emergent nature of learning paths that defy standardization. This signals that some researchers are not only theorizing rhizomatic learning but also empirically investigating it through immersive and interpretive research designs. On the **right side**, the **green cluster** features terms such as *professional development*,

pointing toward a **practical application theme**, especially in adult education, teacher training, and workplace learning. This indicates that rhizomatic learning is not confined to formal classroom contexts but is also being explored as a model for lifelong learning and continuous professional growth. The presence of this cluster implies growing interest in how rhizomatic principles can enhance agency, adaptability, and personalized pathways in ongoing education.

The **blue cluster** that directly connects to "rhizomatic learning" includes theoretical keywords like *multiplicity* and *new materialism*. This reflects the **philosophical grounding** of rhizomatic learning in poststructuralist thought, particularly Deleuze and Guattari's ideas. Terms like *multiplicity* refer to the non-linear, pluralistic nature of learning paths, while *new materialism* introduces an ontological shift emphasizing the entanglement of humans, technologies, and environments in the learning process.
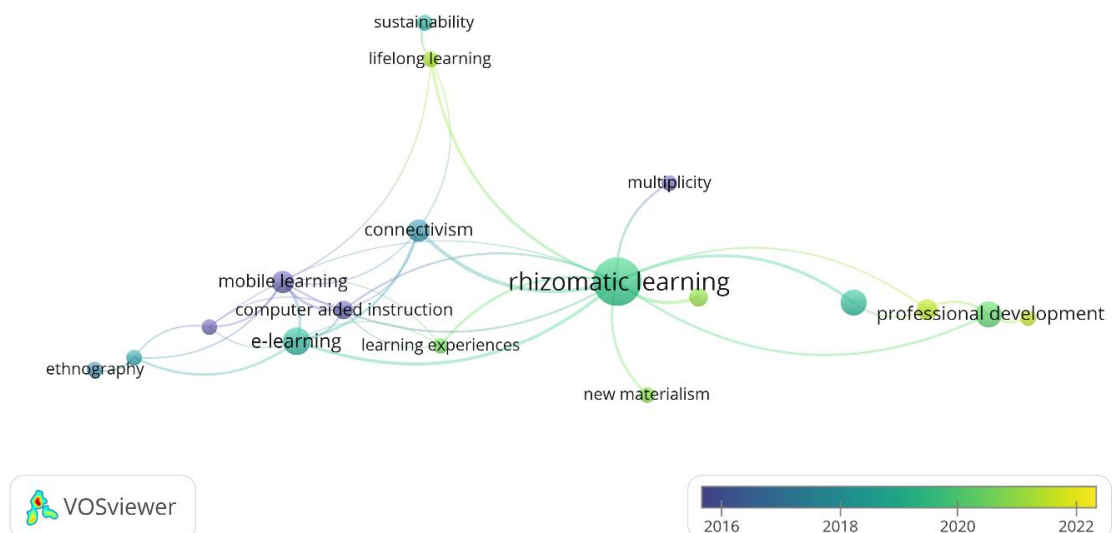

Figure 4. Overlay Visualization
Source: Data Analysis

The temporal co-occurrence map shown above illustrates the evolution of research themes associated with rhizomatic learning from 2016 to 2022. The color gradient—from purple (earlier years) to yellow (more recent)—provides insight into the chronological emergence of keywords. Early research, shown in shades of blue and purple, clustered around terms such as e-learning, mobile learning, computer-aided instruction, and ethnography. These themes reflect the initial emphasis on exploring rhizomatic learning within the context of digital environments and qualitative research, aligning with the rise of online education and constructivist digital pedagogy.

As the field matured, newer keywords such as *professional development*, *sustainability*, and *lifelong learning*—which appear in green to yellow—began to gain prominence in recent years (2020–2022). This indicates a thematic shift toward

applying rhizomatic principles in **adult education and capacity building**, as well as within broader discourses on **sustainable and lifelong learning models**. These developments suggest a growing interest in how rhizomatic learning can be leveraged beyond academic contexts, particularly in ongoing skill development and professional settings, reflecting educational adaptation to evolving societal and labor demands. Furthermore, the consistent presence of keywords like *connectivism*, *learning experiences*, and *new materialism* across multiple time periods suggests their **conceptual durability and theoretical significance** in the field. The enduring linkage between rhizomatic learning and these terms highlights an ongoing integration of poststructuralist theory, experiential learning, and digital networked pedagogy.
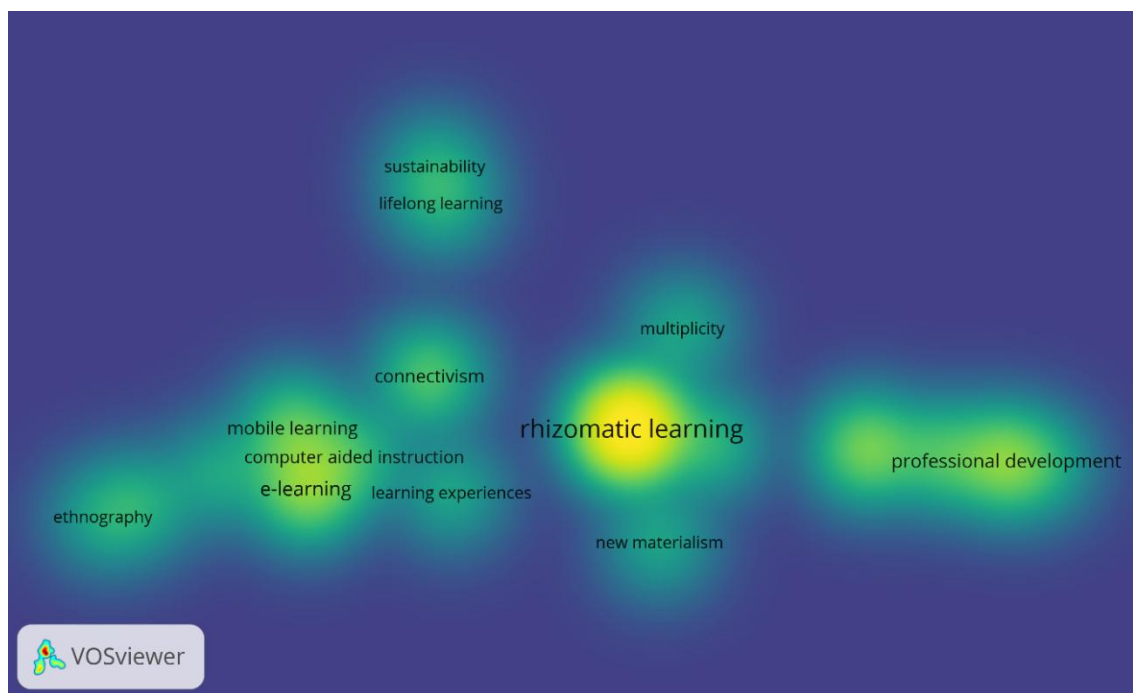

Figure 5. Density Visualization
Source: Data Analysis

The heatmap visualization illustrates the **density of keyword co-occurrence** in the scholarly literature on *rhizomatic learning*. The central

concentration of yellow around the term **"rhizomatic learning"** signifies it as the most frequently occurring and interconnected keyword in the dataset,

serving as the conceptual core of this research domain. Closely surrounding terms such as *new materialism*, *connectivism*, and *learning experiences* also exhibit moderate to high density (green to yellow), suggesting their strong relevance and frequent co-mention in discussions of rhizomatic pedagogy. This central cluster reflects the ongoing theoretical engagement with poststructuralist concepts and learner-centered approaches in educational research. Further from the center, areas of moderate density appear around themes like *professional development*, *e-learning*, and *sustainability*, indicating expanding areas of interest where rhizomatic learning is being applied or discussed in relation to broader educational practices. The presence of distinct but linked clusters—such as *mobile learning* and *ethnography*—reveals how the discourse also spans methodological and technological dimensions.

3.4 Discussion

This bibliometric analysis provides a comprehensive overview of the intellectual landscape, thematic evolution, and collaborative networks in rhizomatic learning research. The findings reveal the centrality of poststructuralist philosophy in shaping the theoretical underpinnings of rhizomatic learning, the emergence of digital pedagogy as a prominent domain of application, and the expansion of scholarly interest into areas such as professional development, sustainability, and lifelong learning. Collectively, these insights affirm that rhizomatic learning has matured into a diverse and interdisciplinary research field with both theoretical depth and practical relevance.

One of the most striking findings is the **dominant influence of Gilles Deleuze**, whose concept of the rhizome, developed with Félix Guattari, serves as the philosophical bedrock of the field. The co-citation analysis reveals that Deleuze is consistently cited alongside other critical theorists such as Michel Foucault, Rosi Braidotti, and Donna Haraway, indicating that rhizomatic learning is deeply embedded in poststructuralist and feminist epistemologies. This theoretical lineage emphasizes decentralization, multiplicity, non-linearity, and anti-hierarchical structures, all of which challenge conventional notions of curriculum, assessment, and teacher authority [1]. The prevalence of these foundational thinkers in the co-citation network underscores the philosophical coherence of the field and highlights its alignment with critical and emancipatory educational discourses.

At the same time, the red cluster anchored by **Dave Cormier** and his collaborators—such as Jenny Mackness, Apostolos Koutropoulos, and Royce Kimmons, marks the **pedagogical adaptation** of rhizomatic theory into practical educational models, particularly in digital environments. Cormier's introduction of rhizomatic learning in the context of MOOCs and online communities helped transition the concept from abstract philosophy to applied pedagogy [17]. This shift is evident in the keyword co-occurrence and temporal analyses, which show early research activity focused on *e-learning*, *mobile learning*, and *connectivism*. These terms form a dense conceptual cluster around rhizomatic learning, indicating that digital platforms have been a critical arena for experimenting with learner-driven, non-linear educational experiences. The linkage with *connectivism*, another network-based learning theory [18], points to shared assumptions about knowledge as distributed, evolving, and socially constructed.

Another important pattern revealed by the data is the **geographical concentration of research** in English-speaking countries, particularly the United Kingdom, United States, and Australia. The country collaboration map

indicates that the United Kingdom serves as a central hub, maintaining strong co-authorship ties with other countries, especially Ireland and the United States. This concentration suggests that rhizomatic learning research is driven primarily by Western academic institutions and reflects dominant theoretical paradigms from the Global North. While emerging contributions from countries like Brazil, Spain, and Finland are noted, the relatively weak connections in these regions highlight the need for more inclusive and global participation in the discourse. This geographical imbalance may also influence the kinds of contexts and learners represented in the research, potentially limiting the applicability of findings to diverse educational settings.

Thematic mapping further reveals that **the scope of rhizomatic learning research is expanding** beyond digital education into areas such as *professional development*, *lifelong learning*, and *sustainability*. These keywords, which appear in green and yellow in the overlay visualization, represent more recent developments in the field. Their increasing presence suggests that scholars are exploring how rhizomatic principles can inform ongoing, self-directed learning in adult education and workplace contexts. This aligns with broader educational trends that emphasize learner autonomy, adaptability, and continuous skill development, particularly relevant in the context of rapid technological change and the knowledge economy [19], [20]. The application of rhizomatic learning in these areas also implies a growing interest in transforming institutional learning structures to better support personalized and emergent learning trajectories.

Moreover, the co-occurrence and heatmap analyses highlight the growing theoretical richness of the field. Keywords such as *new materialism* and *multiplicity* indicate an engagement with emerging ontological and epistemological frameworks that challenge human-centric, linear, and cognitive-dominant models of learning. *New materialism*, for instance, encourages researchers to consider the role of non-human actors, technologies, and environments in the learning process [21]. This reflects a shift from focusing solely on content and cognition to examining the entangled, dynamic relations between learners, media, spaces, and time. These philosophical extensions not only deepen the conceptual foundations of rhizomatic learning but also open new avenues for interdisciplinary research, particularly in areas like curriculum theory, digital humanities, and sociomaterial studies.

An additional trend worth noting is the **methodological diversity** evident in the field. While quantitative studies are limited, the presence of keywords such as *ethnography* suggests a preference for **qualitative, interpretive, and immersive approaches**. Ethnographic methods are particularly suited for studying rhizomatic learning, as they allow researchers to trace complex learning pathways, observe decentralized interactions, and capture the nuances of learner experiences in open and dynamic environments. However, this reliance on qualitative research may also limit the generalizability of findings and the development of standardized metrics to evaluate rhizomatic pedagogies. Future research could benefit from mixed-methods approaches that combine in-depth qualitative insights with broader quantitative analysis to assess effectiveness and scalability.

Despite its growing influence, the field of rhizomatic learning also faces several **conceptual and practical challenges**. First, the abstract nature of its foundational theories can make it difficult to operationalize in structured educational systems that demand standardization, assessment, and accountability. Second, the absence of a

unified framework or model may lead to fragmented applications that dilute the concept's critical and transformative potential. Third, the focus on digital and Western academic contexts risks excluding voices from marginalized communities or non-formal learning environments, where rhizomatic principles may be especially relevant. Addressing these challenges requires more critical dialogue, context-sensitive applications, and collaborative efforts across disciplines and regions.

4. CONCLUSION

This bibliometric study has mapped the intellectual structure, thematic evolution, and collaborative landscape of rhizomatic learning within educational research, revealing its emergence as a rich and interdisciplinary domain. Anchored in poststructuralist philosophy, particularly the works of Deleuze and Guattari, rhizomatic learning has been adapted into diverse pedagogical contexts through digital learning, professional development, and lifelong education. The findings highlight strong conceptual linkages with theories like connectivism and new materialism, while also showing an expanding interest in sustainability and adult learning. Despite its theoretical sophistication and growing application, the field remains geographically concentrated and methodologically fragmented, signaling opportunities for broader empirical validation and global inclusion. As rhizomatic learning continues to evolve, future research should aim to bridge theory and practice, foster international collaboration, and explore its transformative potential across varied educational and cultural landscapes.

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