MUSICOLOGY

A COMPREHENSIVE REVIEW OF MUSICAL CREATIVITY THROUGH THE LENS OF BIBLIOMETRIC ANALYSIS

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ABSTRACT

Objective: Scholars have recently observed a significant advancement in musical creativity (MC). This assessment represents a change in comprehending and interacting with musical ingenuity across diverse cultures and fields of study. Given these recent changes, the present study aims to conduct a bibliometric analysis to elucidate the chronological stages of MC's expansion and investigate the influence of international collaboration on its progress. The objective is to examine the specific countries' contribution to the sector and comprehend the dynamics of cross-border collaborations in promoting creativity. **Method:** The study examines the increasing focus on countries such as China, Spain, Australia, the United Kingdom, and the United States through a thorough bolometric analysis. This study evaluates the scope and characteristics of global collaboration in addition to the impact of the digital age on the innovation of music. This review study primarily examines the noticeable increase in musical creativity, driven by the efficacy of knowledge exchange and intricate problem-solving in the field of MC. **Results:** Moreover, the results demonstrate that the digital age has a beneficial impact on increasing the subject matter and research methods used in MC research. This report emphasises the necessity of a comprehensive, worldwide approach to researching and improving MC. The text proposes redirecting future research efforts towards utilising international collaboration and digital advances to advance the area. This technique has the potential to revolutionise the development of musical creativity, placing it at the forefront of both academic and practical exploration.

KEY WORDS

Musical Creativity, Bibliometric Analysis, International Collaboration, Digital Influence in Music, Research Trends in Music Creativity.

INTRODUCTION

In the past two decades, researchers have investigated music creation using innovative methods such as interdisciplinary collaboration and the introduction of new ideas. The continuous progress of this discipline, propelled by the integration of several fields and developments in technology, indicates its growing scope. However, it is essential to acknowledge the significant deficiencies in comprehension and range (Bagley, Gifford, & McKelvey, 2022; Nijs, Grinspun, & Fortuna, 2024). Psychology previously emphasised the examination of psychological processes and dispositional factors associated with musical creativity. Gardner (1983) provided a comprehensive definition of creativity, while Moneta and Csikszentmihalyi (1996) emphasised the importance of flexibility and intrinsic drive in music creation. These perspectives offer a valuable psychological framework for studying music creation. These influential works offer proof of the significance of psychological investigation in the profound realm of music creativity. However, they also stress the need of surpassing particular cognitive processes. It has been almost twenty years since a eulogy was written for the early researchers in the field of psychology of creativity. This eulogy supported the idea that creativity is not only influenced by psychological cognition, but also involves other factors. This viewpoint is also supported by recent sources (Kaufman & Beghetto, 2023; Xiao et al., 2023).

The advent of the new millennium brought about a revolution in neurology, driven by significant advancements in imaging technologies. Zatorre, Chen and Penhune (2007) and Sawyer and Henriksen (2024) have introduced a novel method that emphasises the examination of the cerebral basis of musical creativity. This technique highlights the specific brain regions involved in the creative process of music. The neuroscientific approach offered a more precise understanding of the physiological basis of creativity by connecting cognitive explanations to biological causes. The transition to a neuroscientific perspective on musical creativity has brought valuable empirical evidence to the field and has allowed for exploration of the ways in which various neurological systems interact during creative musical activities (Cope, 2021; Dietrich & Zakka, 2023; Stahnisch, 2023). Simultaneously, education has become a crucial catalyst for the development of musical creativity. Burnard (2012b) research emphasised the significance of educational environments in cultivating creative abilities through advocating for teaching methods that encourage improvisation and innovative practices in music lessons. In addition, Pearce (2005) demonstrated how the field of computational musicology expanded the investigation of musical innovation. The concept involved utilising computational methods to model and comprehend the artistic procedures in music, offering insight into how technology may imitate, enhance, and perhaps alter the composition, performance, or attitude to music.

The initial investigations into the examination of musical creativity were grounded in cognitive and behavioural psychology, with a primary emphasis on finding the cognitive processes and capacities that facilitate creative expression in music. Gardner (1983) investigation into multiple intelligences, which encompasses musical intelligence, broadened the notion of creativity beyond conventional measures of intelligence. In addition, Moneta and Csikszentmihalyi (1996) and Woody (2021) introduced the term "flow" to describe a state of deep and enjoyable engagement in an activity. This concept has had a significant impact on our understanding of the motivational factors involved in musical creation. The discipline saw a substantial paradigm shift with the emergence of the neuroscientific approach. The advent of Functional magnetic resonance imaging (fMRI) and electroencephalogram (EEG) technology has facilitated researchers in gaining a deeper understanding of the brain's functioning during creative tasks. Zatorre et al. (2007) revealed the crucial role of the prefrontal cortex and the default mode network in the creative process of music. The use of a neuroscientific method has enhanced the comprehension of musical creativity by providing a physiological foundation for previously intangible psychological ideas (Guo & Chueachainat, 2024).

In recent studies, a connection has been established between cognitive theory and empirical evidence, providing an explanation for how the brain functions and supports the intricate and diverse process of creating music (Pohjannoro, 2022; Schiavio et al., 2022; Woody, 2021). Nevertheless, this integration highlights a notable research challenge: the lack of comprehension regarding how these cognitive theories and neuroscientific discoveries might be realistically applied to develop successful educational approaches that enhance musical creativity. Integrating psychology and neuroscience methodologies enhances the process of musical creation, encompassing motivation and cognition at an abstract level and brain activity at a physical level (Green et al., 2023; Vaisvaser, 2021). Within the field of education, the perspective on creativity centres around strategies to encourage and cultivate creativity in students, such as the practices of improvisation and composition. Burnard (2012a) has emphasised the significance of these elements in music education, proposing for a teaching

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approach that promotes creative exploration. The focus is transitioning from a purely technical music education to a more holistic cultivation of musical skills. The task at hand is to redefine music education in a manner that allows students to fully explore their creative abilities. This will involve integrating theoretical knowledge with practical skills, thereby meeting the urgent requirement to connect academic insights with real-world applications in music education (Song, Punchatree, & Tosati, 2023).

Creative music research has been impacted by the digital age. Hargreaves (2012) and Strandgaard Pedersen, Slavich and Khaire (2020) conducted research on the influence of widely distributed digital technology on the advancement of creativity. Their concentration lies on examining the influence of digital media technologies, Internet platforms, and new media on the process of music creation, distribution, and consumption. Consequently, this advancement has facilitated the creation and dissemination of music, thereby establishing an essential equitable environment for global creative music endeavours and the sharing of songs. Digitization in music education and production opens up new avenues for creative expression and learning, while also fostering the ongoing growth of music creativity (Kashina, Pavlov, & Li, 2020; Walzer, 2023).

This research seeks to conduct a comprehensive analysis of the existing literature on musical creativity, with the objective of identifying prominent patterns, influential pieces of work, and collaborative networks that have significantly influenced the subject. This analysis aims to identify overlooked areas and suggest a comprehensive methodology for future research in musical creativity. Furthermore, in contrast to psychological creativity, the deficiency in musical creativity research appears to be in its insufficient exploration of social and psychotherapeutic dimensions. This bibliometric analysis seeks to address the deficiency in research on music creativity. The study centres on the sociocultural factors that influence musical creativity and employs the creative process of music to boost mental well-being and cognitive abilities. This study employed a comprehensive bibliometric technique to examine existing literature, identify significant trends and prominent articles, and explore themes and opportunities for ongoing research development. Thus, this study offers a more extensive comprehension of musical creativity from cultural, therapeutic, and educational standpoints. By employing this approach, we can acquire a fresh comprehension of the presently neglected domain of music creativity, thereby promoting subsequent scientific endeavours.

LITERATURE REVIEW

The literature examines the progression and diverse aspects of study on musical creativity, which is characterised by continuous growth. This overview examines the development of critical theory, research, and the evolution of our understanding of musical creativity, starting with its early origins and leading up to modern perspectives.

Evolution of Music Creation Research

The research conducted by various authors demonstrates the transition from a psychological emphasis, beginning with Gardner's theory of multiple intelligences, to a multidisciplinary approach that incorporates neurological, cultural, educational, and technological viewpoints in comprehending musical creativity. Gardner's idea of multiple intelligences, which goes beyond conventional measures such as Intelligence Quotient (IQ) testing, has laid the groundwork for investigating musical intelligence and its impact on creativity (Aguayo, Ruano, & Vallejo, 2021). The integration of this theory with other psychological theories, like Robert J. Sternberg's, has resulted in the development of a more thorough comprehension of musical intelligence (Cavas & Cavas, 2020). In addition, scholars have analysed the educational ramifications of the theory of multiple intelligences, investigating its potential application in teaching methods to enhance creativity, development, and academic achievement (Sternberg, 2021). Expanding upon these fundamental viewpoints, Shi (2023) and Blackburn and Hewitt (2020) have emphasised recent progress in incorporating digital tools and collaborative platforms in music education. These studies highlight the changing educational approaches that emphasise the important role of technology in improving creative involvement and learning experiences in music. Moreover, research has investigated the use of the many intelligences hypothesis in particular educational settings, such as scientific education and thematic learning, with the aim of improving student creativity and involvement (Miller, Manderfeld, & Harsma, 2019; Saraswati, Wahidmurni, & Zuhriyah, 2023). By taking into account neurological, cultural, educational, and technical elements, these multidisciplinary methods have broadened our comprehension of musical creation.

A Psychological Perspective on Musical Creativity

Psychological perspectives on musical creativity are informed by key notions such as Csikszentmihalyi's 'flow,' Deci and Ryan's Self-Determination Theory, and cognitive neuroscience results. These concepts

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enhance our comprehension of the cognitive processes implicated in creative endeavours within the realm of music (Hvidtfeldt, 2023; Lage-Gómez, Chatelain, & Cremades-Andreu, 2023; van der Schyff & Schiavio, 2022). Csikszentmihalyi's theory of 'flow' examines the state of ideal experience in which humans are completely absorbed and concentrated on a creative activity, such as music performance (Huovinen, 2021). Norsworthy, Jackson and Dimmock (2021) have conducted recent research that builds upon Csikszentmihalyi's theory. This research investigates the physiological indicators of 'flow' during musical performance and how it relates to increased creative production. The self-determination theory highlights the significance of intrinsic motivation and autonomy in promoting creativity. It suggests that musicians who experience a sense of choice and ownership in their creative process are more inclined to participate in innovative musical practices (Gande, 2022). In addition, Hendriks et al. (2023) have utilised self-determination theory in the context of music education, illustrating how teaching approaches that promote autonomy can greatly improve students' involvement and drive in music creation and improvisation. Cognitive neuroscience research offers valuable insights into the neurological mechanisms underlying musical creativity, namely the interaction between spontaneous and regulated processing modes in the perception and execution of musical ideas. In a recent study, Faber and McIntosh (2020) have made significant progress in this field by identifying distinct neural networks that are activated during musical improvisation. This research provides valuable insights into the brain's involvement in aiding the emergence of creative musical ideas. These many viewpoints jointly lead to a full comprehension of the psychological facets of musical creativity.

Neuroscientific Insights into Musical Creativity

The generation of new ideas, regulation of the creative process, and coordination between different brain networks are all essential for supporting musical creativity (Schiavio & Benedek, 2020; Vartanian, 2022). The convergence of artistic expression in musical performance entails the integration of bodily movements with the instrument, perceptual and cognitive faculties, and the artist's skillful execution (Gande, 2022). Creative thinking involves the functional connection between two brain networks: the default network and the executive control network. The switching between these networks is regulated by the salience network (Stevens Jr & Zabelina, 2019; Whitney, 2018). Recent findings by Adamaszek et al. (2022) emphasise the cerebellum's function in enhancing and promoting the smoothness of creative musical expression, indicating the involvement of a wider network of brain regions in musical creativity beyond the conventional focal areas. Within the realm of musical creativity, there are two primary varieties: improvisation and interpretation. Each of these categories engages distinct cognitive processes and specific regions of the brain (Rahman et al., 2021). In addition, Ramírez-Moreno et al. (2022) have identified certain patterns of brain activity that are linked to the production of original musical ideas during improvisation. This finding emphasises the intricate and diverse cerebral processes involved in the creation of music. Musical improvisation is heavily dependent on the capacity for real-time invention and the skill to generate fresh musical output that appears to be spontaneous (Loui, 2021). The neuroscientific underpinnings of musical creativity encompass the engagement of cognitive control, motoric and emotional communication, audio-visual integration, and semantic processing regions within the brain. The recent study conducted by Chen, Beaty and Qiu (2020) examines how emotional states influence creative musical output. This research reveals the complex connection between emotional regulation networks and creative processes, enhancing our comprehension of the emotional aspects of musical creativity.

Educational Impact on Musical Creativity

Extensive research has been conducted on pedagogical methods, curriculum creation, and the roles of improvisation, composition, and learning engagement in order to enhance musical creativity and foster the development of students' creative and cognitive skills. Burnard, Murphy, and Sawyer have made significant contributions to the field of critical studies in this area. Burnard's research emphasises the profound impact of innovative pedagogy and the significance of engaging with traditional Western music to foster culturally pertinent and community-oriented musical frameworks and activities (Massy & Sembiante, 2023). Murphy's work mostly revolves around the influence of musical improvisation on the cognitive development of youngsters. The study uncovers noteworthy discoveries that demonstrate a considerable enhancement in musical range, adaptability, originality, and structure as a result of musical improvisation (Zhang, 2023). Sawyer highlights the interdependence of curriculum, pedagogy, and the triad including teachers, students, and knowledge. The statement affirms that promoting creativity is a multifaceted procedure that requires the use of different teaching methods. In a recent study conducted by Ng, Ng and Chu (2022), the authors go deeper into the intricacies

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of this subject. They demonstrate how the use of digital music-making tools and online collaboration platforms can enhance conventional teaching approaches, providing fresh opportunities to involve students in creative musical endeavours. Teachers can enhance creativity by offering students a variety of cognitive frameworks (Zavadska & Rauduvaite, 2020). In Bassachs et al.'s (2020) recent research, the incorporation of cross-disciplinary studies, specifically the integration of science, technology, engineering, arts, and mathematics (STEAM) approaches in music education, shows a promising path towards improving students' creativity and critical thinking skills. The existing body of research clearly shows that transformative teaching takes place when novel instructional strategies are implemented. Creativity is nurtured through the process of improvisation. Furthermore, the substance and approach of our instruction have a profound impact on the development of innovative thinking and cognitive capabilities.

The study aims to incorporate and enhance current viewpoints on musical creation. The objective is to enhance the historical underpinnings of prior research and progress beyond basic notions towards a more holistic comprehension. The study also examines the psychological and educational dimensions of musical creativity. The objective is to provide a comprehensive comprehension of the subject matter and suggest novel methodologies for future investigation.

METHODS AND MATERIALS

The Web of Science Core Collection (WoSCC), PubMed, and Scopus databases surpass other databases in the accuracy of their literature-type annotations, making them the optimal choice for literature analysis. Therefore, we elected to conduct our search within these databases. On November 30, 2023, we searched WOS, PubMed, and Scopus for all articles related to music creativity published between 2004 and November 30, 2023. The search formula was as follows: (TS=(music creativity) OR TS=(musical creativity)). The literature selection for this study was based on the following inclusion criteria: (1) full-text publications concerning music creativity; (2) articles and review manuscripts written in English; (3) articles published between January 1, 2004, and November 30, 2023. The exclusion criteria included (1) topics unrelated to music creativity, (2) articles in the form of conference abstracts, news, briefings, etc. Plain text versions of the papers were exported. GraphPad Prism v8.0.2 was utilized to analyze and illustrate the total consideration of the article for the current study. Furthermore, CiteSpace (6.1.6R 64-bit advanced version) and VOSviewer (version 1.6.17) were employed to analyze these data and visualize scientific knowledge maps.

VOSviewer v.1.6.17, created by Waltman and others in 2009, is a JAVA-based free software designed to analyze large volumes of bibliographic data and its presentation in map format (Van Eck & Waltman, 2010). Professor Chaomei Chen developed the CiteSpace (6.1.6R) software to visualize research outcomes in a specific field by mapping literature co-citation networks. This software is intended to use an experimental framework for exploring new concepts and evaluating existing technologies. It enables users to gain a better understanding of knowledge domains, research frontiers, and trends, as well as to forecast future research developments.

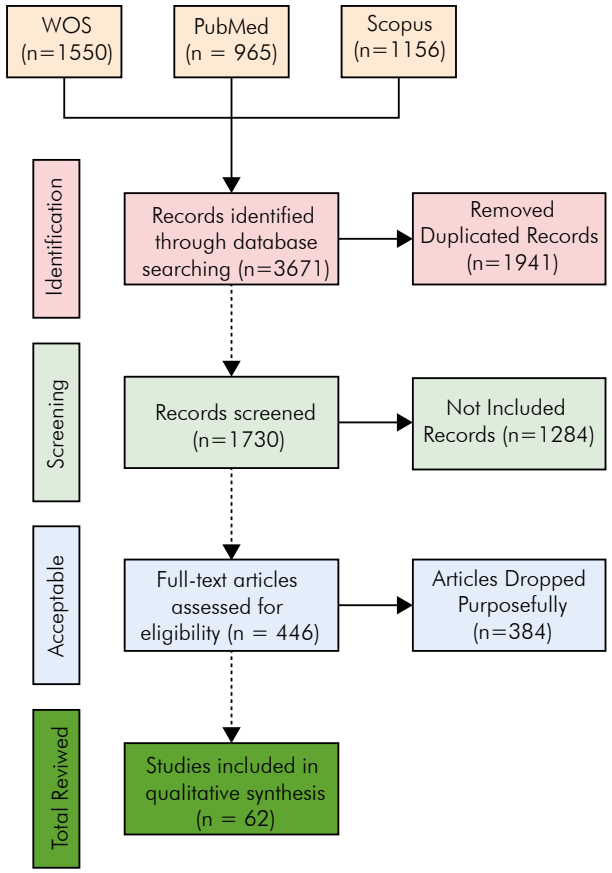

Figure 1: A Comprehensive PRISMA Flow Diagram Featured in a Published Systematic Analysis.

RESULTS AND DISCUSSION

Between January 1, 2004, and November 30, 2023, a total of 3,671 documents pertaining to music creation were found in the WoSCC, PubMed, and Scopus databases. This collection consists of 3,588 articles, accounting for 94.39% of the total, and 83 reviews, which make up 5.61%. The literature encompasses a total of 151 nations and regions, 5,154 institutions, and 2,477 writers. Since 2004, there has been a consistent rise in the annual publication of articles

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(Figure 2). The pattern may be categorised into three distinct phases: an initial period of sluggish growth between 2004 and 2008, during which the annual publication volume remained below 100 papers; a moderate and steady rise from 2009 to 2017; and a sudden and significant explosion in publication volume starting from 2018, culminating in a peak in 2022. This peak is associated with major global events and technological breakthroughs that have greatly impacted the widespread use of digital platforms for creating and sharing music. Furthermore, a more thorough examination indicates that there was a significant rise in interdisciplinary research that combined music and cognitive science, particularly in areas that overlapped with artificial intelligence. This increase in research may have played a role in the rush of publications during this time. This indicates that the field has garnered extensive recognition since 2018.

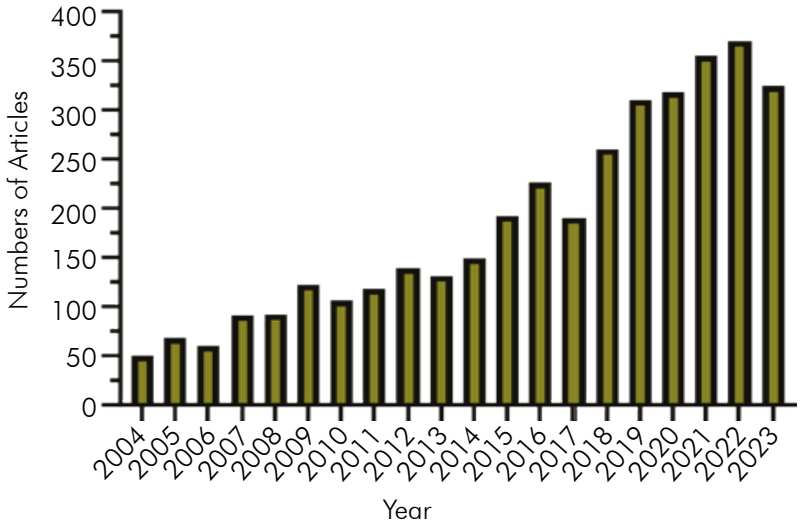

Figure 2: Chart of the Annual Number of Publications.

Countries and Institutions

Studies on music originality have been carried out in 151 nations and locations. Figures 3 and 4 depict the yearly publishing volumes of the leading 10 countries in this particular sector throughout the previous decade. The five leading countries are the United States, the United Kingdom, Australia, Spain, and China. The United States dominates in terms of publishing volume, representing 24.22% of the total publications, surpassing other countries by a substantial margin. In order to provide a clearer understanding of these patterns, it would be beneficial to analyse the particular subjects of study covered in these publications. This analysis could help identify the precise areas of interest that contribute to the notable citation rates. An area that need more research is the increasing use of neuroscientific methods in music instruction in the United States.

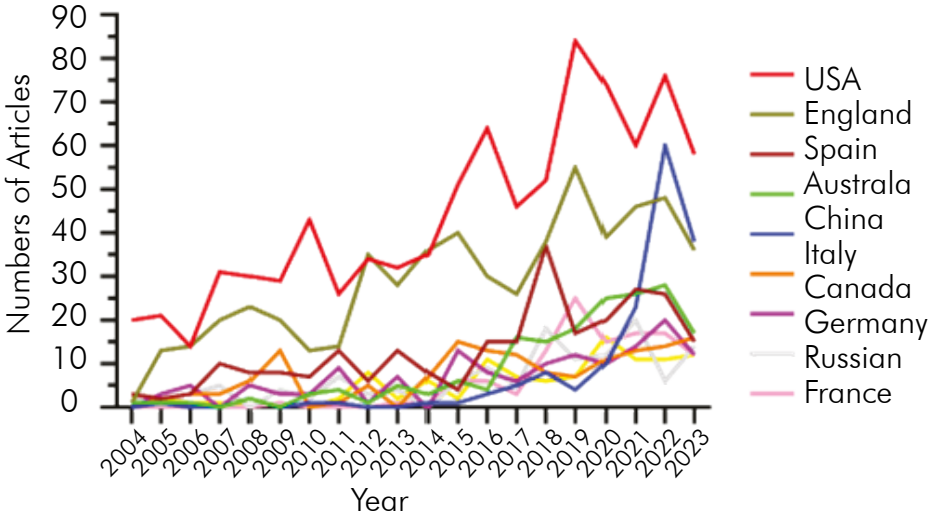

Figure 3: Trend Analysis of National Publications.

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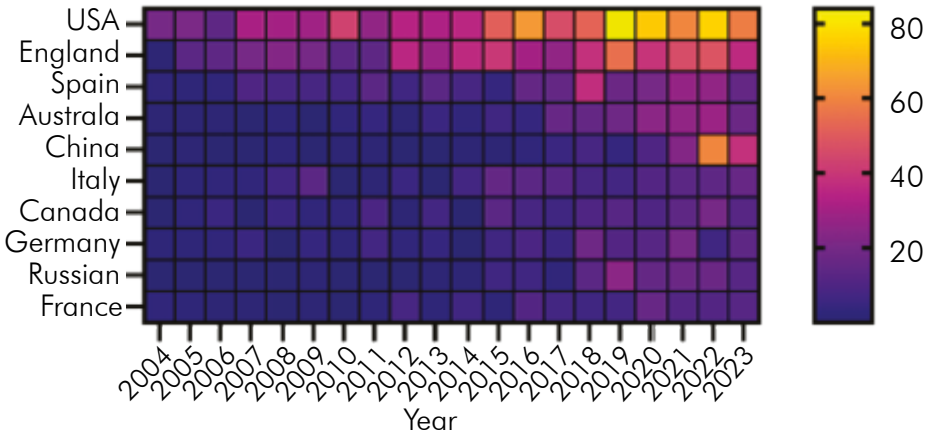

Figure 4: National Publication Calorimetric Map.

In ranking the top ten countries/regions by volume of published papers, the United States stands out with its papers being cited 19,110 times (Table 1), significantly more than any other country/region. The citation-to-publication ratio (21.50) of the United States ranks first among all countries/regions. Additionally, the United States has the highest number of published papers, totaling 889. The United Kingdom ranks second in publication volume with 575 papers and second in citation count with 10,863 citations. Its citation-to-publication ratio (18.89) is the highest among all countries.

As shown in Figure 5, the cooperation network indicates close collaboration between the highest-producing countries, the United States, and countries like Australia, China, Spain, and Italy. The United Kingdom shows tight collaboration with countries like Germany, Russia, and France. The United States has a large volume of publications and a high frequency of citations, and it exhibits a high centrality of 0.21, indicating its leading position in this field. Moreover, the analysis of collaborative networks suggests that interdisciplinary projects often result in higher citation rates, underlining the value of cross-border and cross-disciplinary research. Detailed case studies of such successful collaborations could provide insights into best practices for fostering such partnerships.

Table 1: National Publication Scale.

Rank	Country/Region	Article Counts	Centrality	Percentage (%)	Citation	Citation per Publication
1	USA	889	0.21	24.22	19110	21.50
2	England	575	0.14	15.66	10863	18.89
3	Australia	257	0.05	7.00	3225	12.55
4	Spain	176	0.07	4.79	1635	9.29
5	China	158	0.08	4.30	634	4.01
6	Italy	151	0.02	4.11	2835	18.77
7	Canada	141	0.05	3.84	2400	17.02
8	Germany	133	0.01	3.62	1784	13.41
9	Russian	117	0.02	3.19	89	0.76
10	France	109	0.02	2.97	1088	9.98

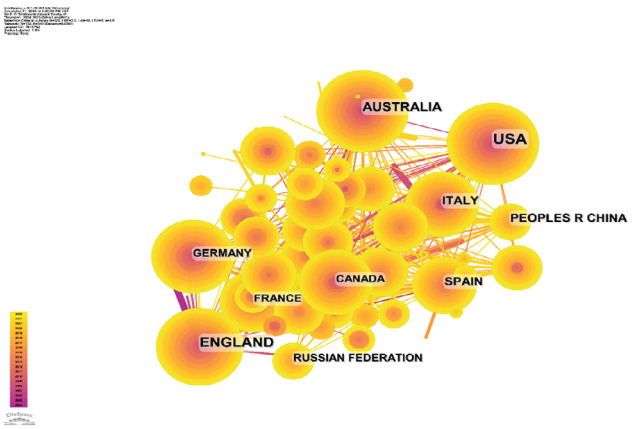

Figure 5: Map of National Cooperation Networks.

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A total of 5,154 institutions have systematically published articles related to music creativity. Among the top ten institutions in terms of publication volume, four are from the United Kingdom, two are from the United States, and the remaining four are from Australia, Italy, Finland, and Austria, respectively (Table 2, Figure 6). Queen Mary University of London has the highest number of publications (13 papers, 212 citations, averaging 16.31 citations per paper). The University of Padua ranks second (13 papers, 451 citations, 34.69 citations per paper), and the University of Melbourne ranks third (10 papers, 153 citations, 15.30 citations per paper).

Further analysis revealed that domestic institutions tend to collaborate more with other institutions within their own country. Therefore, we call for strengthening collaboration between domestic and international institutions to break academic barriers. An exploration of thematic concentrations within these institutions can provide a clearer picture of the research landscape, revealing whether certain topics are regional or universal in their research focus. It is also crucial to investigate the nature of these domestic collaborations to understand how local research cultures and policies might influence music creativity research.

Table 2: Document List of Institutions.

Rank	Institution	Country	Number of Studies	Total Citations	Average Citation
1	Queen Mary Univ London	England	13	212	16.31
2	Univ Padua	Italy	13	451	34.69
3	Univ Melbourne	Australia	10	153	15.30
4	Univ London	England	10	555	55.50
5	UCL	England	8	406	50.75
6	Karl Franzens Univ Graz	Austria	7	188	26.86
7	Univ N Carolina	USA	7	369	52.71
8	Univ Helsinki	Finland	6	179	29.83
9	Georgia State Univ	USA	6	52	8.67
10	Univ Oxford	England	6	218	36.33

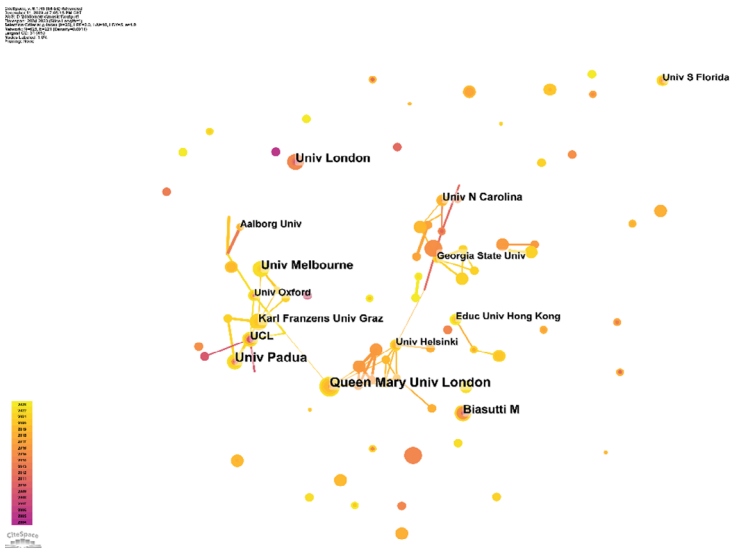

Figure 6: Network of Agency Cooperation.

Table 3: Magazine Publication Scale.

Rank	Journal	Article Counts	Percentage (3671)	IF (2022)	Quartile in Category
1	frontiers in psychology	101	2.75	3.8	Q1
2	psychology of music	79	2.15	1.7	Q4
3	music education research	70	1.91	2.3	Q3
4	International journal of music education	63	1.72	1.8	Q3
5	thinking skills and creativity	61	1.66	3.7	Q1
6	musicae scientiae	53	1.44	2.4	Q2
7	music educators journal	50	1.36	0.8	Q2
8	journal of creativity in mental health	41	1.12	0.6	Q4
9	British journal of music education	36	0.98	2.0	Q3
10	creativity research journal	36	0.93	2.6	Q2

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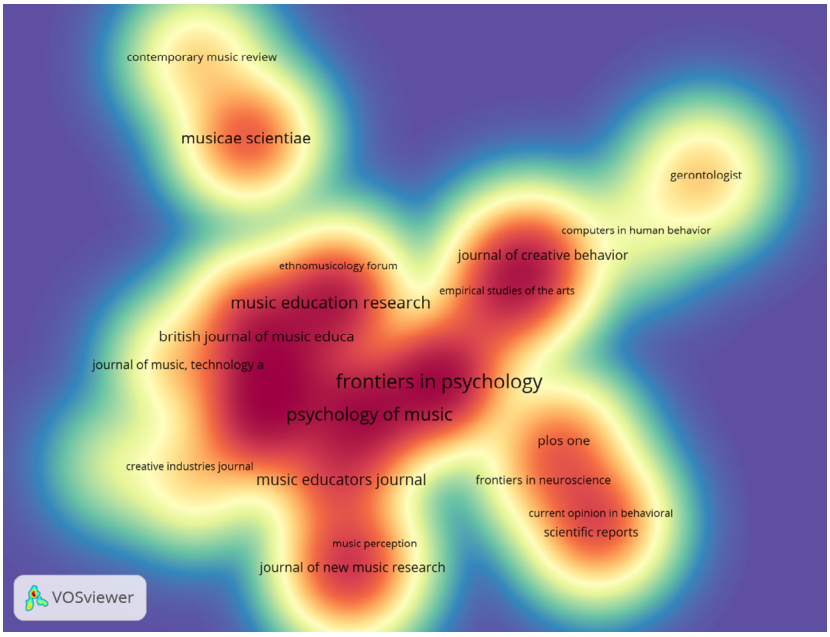

Figure 7: Magazine Publication Density Chart.

Tables 3 and 4 list the top 10 journals with the highest output and the most citations, respectively. "Frontiers in Psychology" leads in publication volume in this field with 101 papers, accounting for 2.75% of the total. It is followed by "Psychology of Music" with 79 papers (2.15%), "Music Education Research" with 70 papers (1.91%), and "International Journal of Music Education" with 63 papers (1.72%). Among these top-producing journals, "Frontiers in Psychology" has the highest Impact Factor (IF) of 3.8. Half of these journals are classified in the Q3 or Q4 quartile.

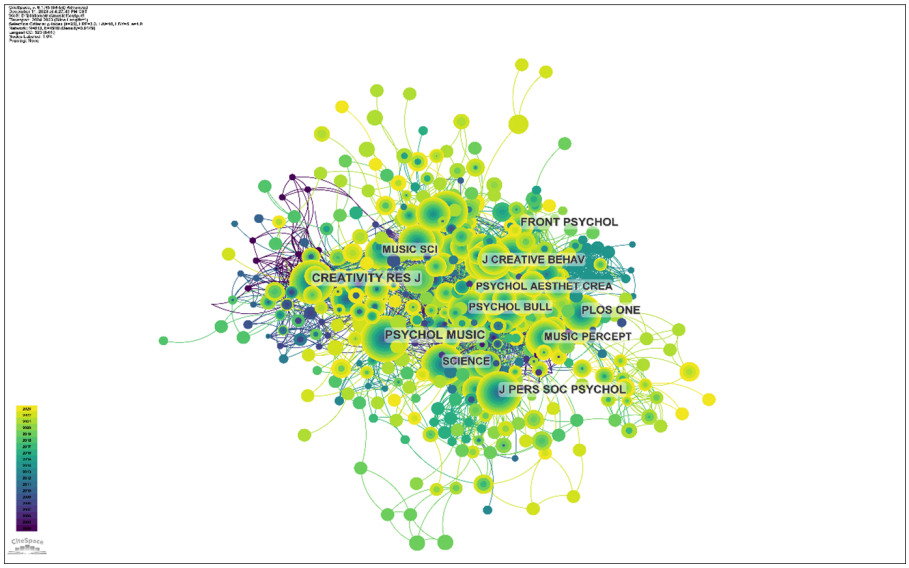

Figure 8: Magazine Co-citation Network Diagram.

The influence of journals is determined by the frequency of their co-citations, which reflects their significant impact on the scientific community. According to Figure 8 and Table 4, the most co-cited journal is "Psychology of Music" with 264 citations, followed by "Psychology of Music" again (possibly a different metric or error in the text) with 245 citations, and "Frontiers in Psychology" with 224 citations. Among the top 10 journals regarding co-citation frequency, "Science" stands out with 140 citations and has the highest Impact Factor (IF) of 56.9. In the list of co-cited journals, 90% are ranked in the Q1/Q2 quartiles, indicating a high level of academic recognition and impact. A closer look at the most influential papers would uncover the methodologies and concepts that resonate most within the MC community. Understanding why certain journals and articles have a higher impact can guide future research directions and strategies for dissemination. This

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detailed exploration into the co-citation networks not only highlights the most impactful journals and articles within the music creativity research community but also sets the stage for future studies to build upon these foundational works

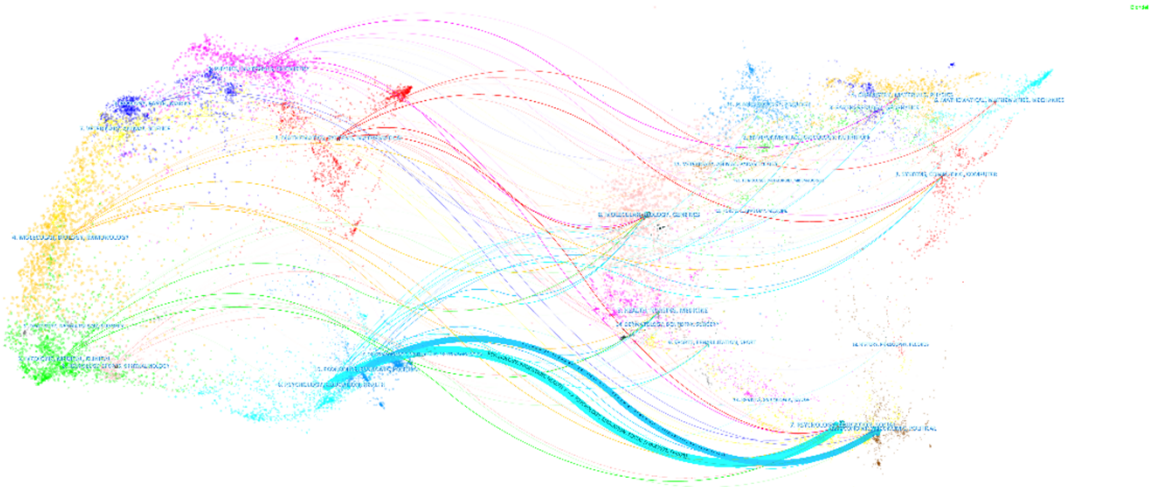

Figure 9: Periodical Double Overlay Diagram.

A dual-map overlay depicts the thematic distribution of academic publications (Figure 9). The colored trajectories represent citation links, citing journals on the left and cited journals on the right. Based on the results displayed, two main colored citation paths were identified. Research published in economics / economic/ political journals is primarily cited by research in the same field. Similarly, studies published in the psychology/education/health domain are predominantly cited by research in journals within the psychology/education/social fields. This indicates distinct, domain-specific citation networks that reflect the interdisciplinary nature of research on music creativity.

Table 4: Magazine Co-citation Table.

Rank	Cited Journal	Co-citation	IF (2022)	Quartile in Category
1	Psychol Music	264	1.7	Q4
2	Psychol Music	245	2.6	Q2
3	Front Psychol	226	3.8	Q1
4	J Pers Soc Psychol	218	7.6	Q1
5	Plos One	203	3.7	Q2
6	Psychol Aesthet Crea	170	3.6	Q1
7	Music Sci	154	2.4	Q2
8	J Creative Behav	147	3.9	Q1
9	Psychol Bull	140	22.4	Q1
10	SCIENCE	140	56.9	Q1

Authors and Co–citation Authors

Table 5: Authors' Publications and Co-citations.

Rank	Author	Count	Location	Rank	Co-cited Author	Citation
1	biasutti, Michele	13	AUSTRALIA	1	CSIKSZENTMIHALYI M	292
2	wiggins, geraint a.	9	England	2	BURNARD P	233
3	daikoku, Tatsuya	8	England	3	AMABILE TM	213
4	Schiavo, Andrea	8	USA	4	RUNCO MA	207
5	Qiu, Jiang	7	China	5	STERNBERG RJ	188
6	beaty, roger e.	6	USA	6	SAWYER RK	182
7	Chen, Guilin	6	China	7	SIMONTON DK	180
8	Randles, Clint	6	USA	8	KAUFMAN JC	168
9	anselmo mora-gutierrez, roman	5	USA	9	GUILFORD JP	152
10	Bryan-kinns, nick	5	England	10	HICKEY M	147

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Table 5 lists the top 10 authors who have published the most papers on music creativity among all authors in the field. These top 10 authors have published 73 papers, accounting for 1.99% of all papers in the domain. Michele Biasutti leads with the most published research papers, totaling 13; Geraint A. Wiggins has 9 papers, and Tatsuya Daikoku has 8. Further analysis reveals that among the top 10 authors, four are from the United States, three are from the United Kingdom, two are from China, and one is from Australia. VOSviewer visualizes the network among these authors (Figure 10), highlighting the formation of core author groups based on different institutions/countries. These authors tend to collaborate more within their respective groups, indicating a preference for intra-group cooperation in music creativity research.

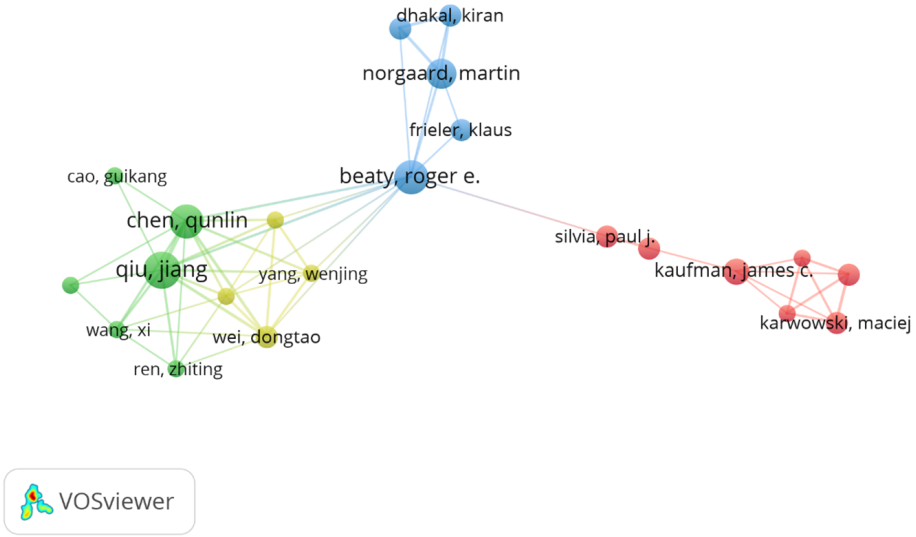

Figure 10: Author Collaboration Network Diagram.

Figure 11 and Table 5 display the top 10 most co-cited and most cited authors, respectively. 52 authors have been cited more than 50 times, indicating that their research holds high prestige and influence. The most prominent nodes in the network are associated with the most co-cited authors, including M. Csikszentmihalyi (292 citations), P. Burnard (233 citations), and T.M. Amabile (213 citations). These nodes and citation counts reflect the significant impact these authors have had in music creativity research, marking them as key figures in the field.

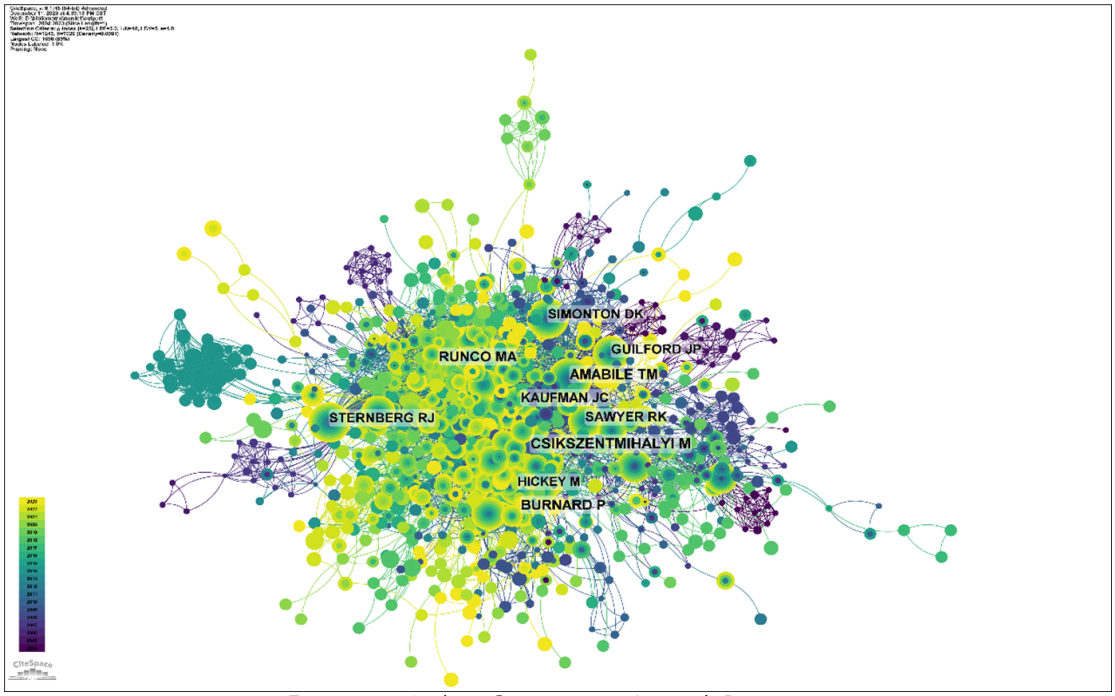

Figure 11: Author Co-citation Network Diagram.

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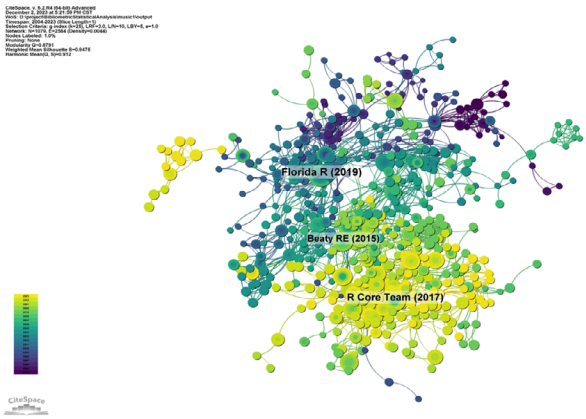

Figure 12: Network Diagram of Co-cited Documents.

Over a while, from 2004 to 2023, with each year as a time slice, the co-citation reference network comprised 881 nodes and 2,222 links (Figure 12). According to Table 6, which lists the top 10 most co-cited articles, the most frequently co-cited reference is the article "The Neuroscience of Musical Improvisation" published in "Neuroscience and Biobehavioral Reviews" (IF=8.2). The first author of this seminal work is Beaty RE. This review synthesizes functional magnetic resonance imaging (fMRI) studies of musical improvisation (including vocal and instrumental improvisation) involving subjects like jazz pianists, classical musicians, freestyle rap artists, and non-musicians. The research highlights a network of frontal brain regions typically associated with improvisatory behaviors, including the pre-supplementary motor area, medial prefrontal cortex, inferior frontal gyrus, dorsolateral prefrontal cortex, and dorsal premotor cortex. Activation in the premotor area and lateral prefrontal regions suggests that seemingly unconstrained behaviors may benefit from motor planning and cognitive control.

Meanwhile, activation in the cortical midline areas indicates characteristics of spontaneous cognition in the default network. In summary, these results may reflect cooperation between large-scale brain networks related to cognitive control and spontaneous thought. The literature on improvisation is discussed in conjunction with Pressing's theoretical model and within the broader context of brain-based studies of creative cognition. It is found that most of the top 10 most co-cited articles are foundational publications in the field of music creativity.

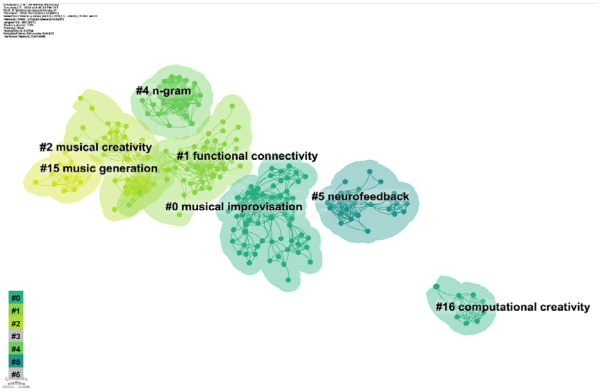

Figure 13: Clustering Diagram of Co-cited Documents.

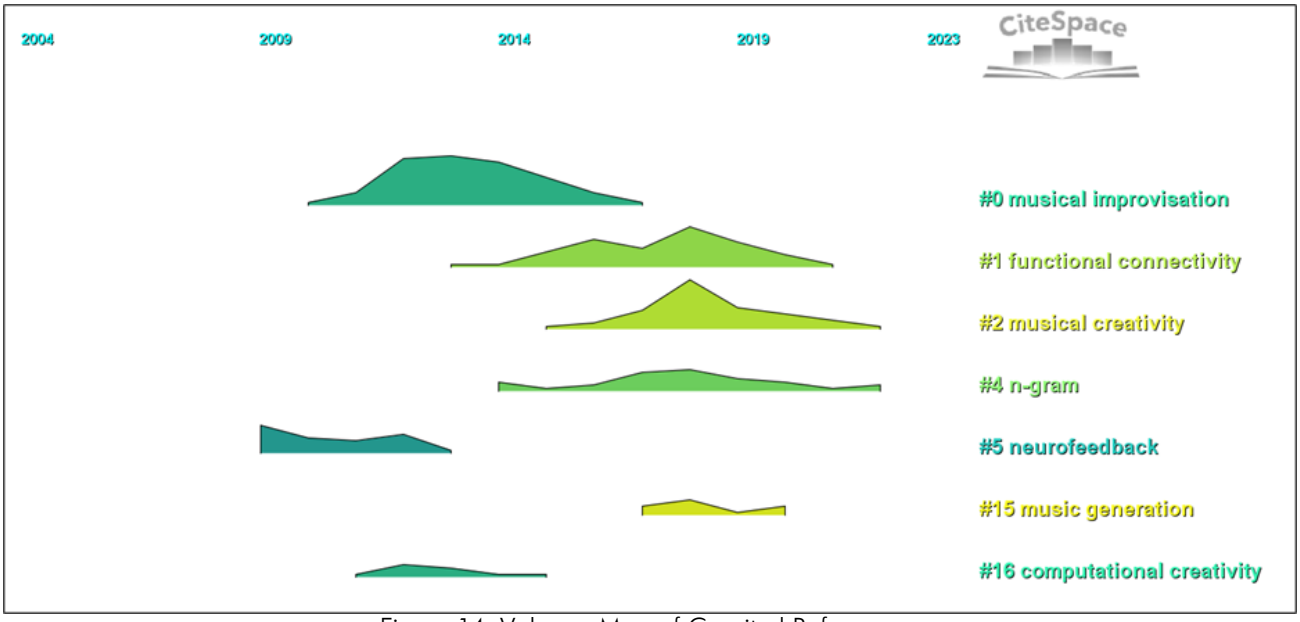

Figure 14: Volcano Map of Co-cited References.

We conducted co-citation reference clustering and temporal clustering analyses (Figures 13 and 14). It was observed that 'musical improvisation' (cluster 0), 'neurofeedback' (cluster 5), and 'computational creativity' (cluster 16) emerged as early and mid-term research hotspots. On the other hand, 'functional connectivity' (cluster 1), 'musical creativity' (cluster 2), 'n-gram' (cluster 4), and 'music generation' (cluster 15) represent the current hot topics and trends in the field.

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These findings indicate a shift in the focus areas of research in music creativity over time. Initially, the emphasis was on improvisation, neurofeedback in creative processes, and the computational aspects of creativity. More recently, attention has turned towards understanding the functional connectivity of the brain during creative processes, directly studying musical creativity, exploring n-gram models in music, and generating music through various means. This evolution reflects the expanding and diversifying nature of research in music creativity. The changing trends also mirror the evolving nature of music consumption and creation in society, especially as digital music platforms have become increasingly prevalent. These platforms not only change how music is consumed but also how it is created, offering new tools and modes of collaboration.

Table 6: Literature Co-citation Table.

Rank	Title	Journal If (2021)	Author(S)	Total Citations
1	The Neuroscience Of Musical Improvisation	Neuroscience And Biobehavioral Reviews(If=8.2)	Beaty Re	24
2	Addressing A Paradox: Dual Strategies For Creative Performance In Introspective And Extrospective Networks	Cerebral Cortex (If=3.7)	Donnay Gf	19
3	Connecting To Create: Expertise In Musical Improvisation Is Associated With Increased Functional Connectivity Between Premotor And Prefrontal Areas	Journal Of Neuroscience (If=5.3)	Juslin Pn	17
4	Creative Cognition And Brain Network Dynamics	Trends In Cognitive Sciences (If=19.9)	Pinho Al	15
5	Creativity As A Distinct Trainable Mental State: An Eeg Study Of Musical Improvisation	Neuropsychologia (If=2.6)	Salimpoor Vn	14
6	Musical Creativity "Revealed" In Brain Structure: Interplay Between Motor, Default Mode, And Limbic Networks	Scientific Reports (If=4.6)	Turchet L	13
7	Rapid And Flexible Creativity In Musical Improvisation: Review And A Model	Annals Of The New York Academy Of Sciences (If=5.2)	Leyshon A	11
8	Jazz Musicians Reveal The Role Of Expectancy In Human Creativity	Brain And Cognition (If=2.5)	Savage Pe	10
9	Neural Substrates Of Spontaneous Musical Performance: An fMRI Study Of Jazz Improvisation	Plos One (If=3.7)	Mehr Sa	10
10	Neural Substrates Of Interactive Musical Improvisation: An fMRI Study Of 'Trading Fours' In Jazz	Plos One (If=3.7)	Goodfellow I	10

Keyword Analysis

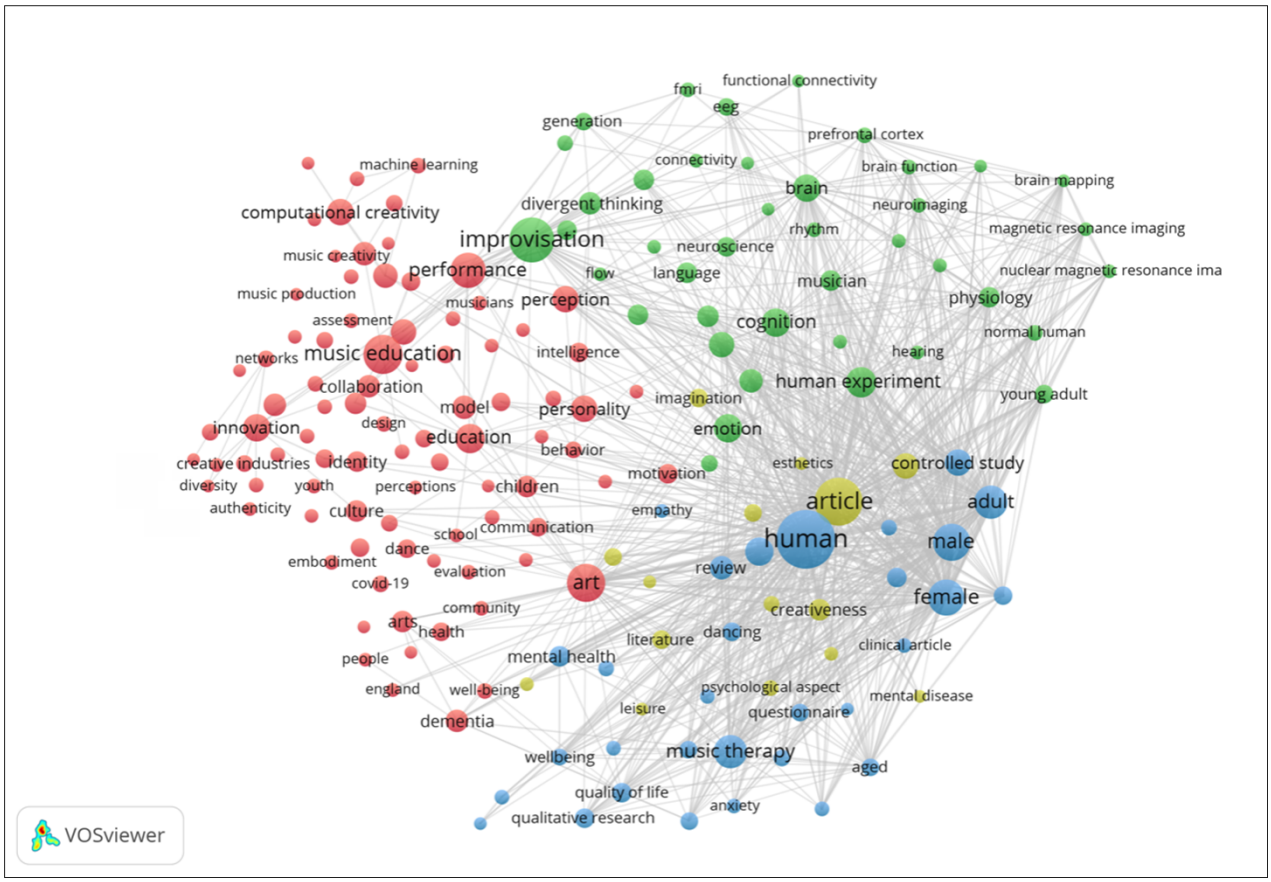

Figure 15: Network Diagram of High-frequency Keywords.

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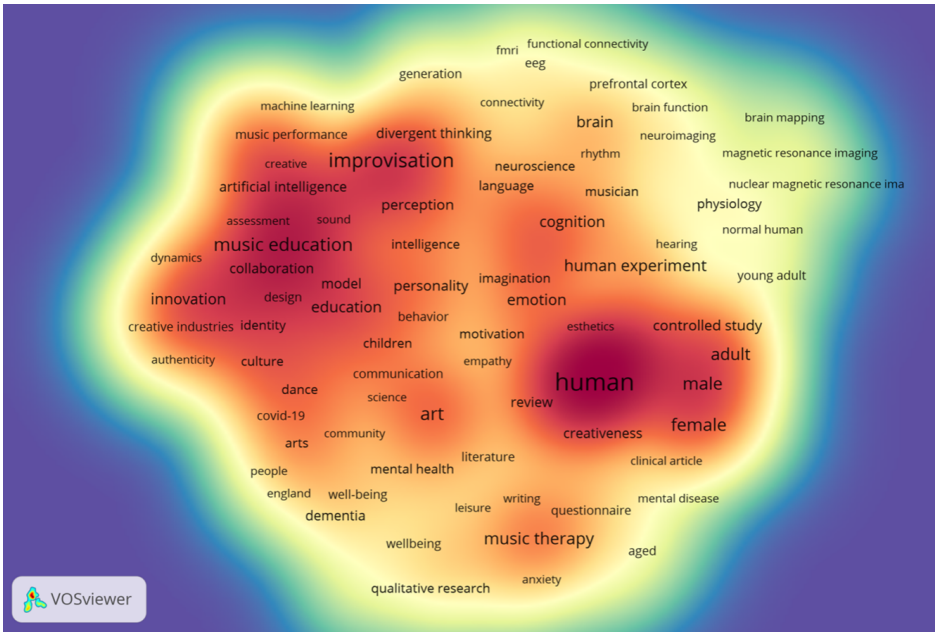

Figure 16: Keyword Density Map.

Table 7: High-frequency Keywords Table.

Rank	Keyword	Counts	Rank	Keyword	Counts
1	Human	370	11	Human Experiment	171
2	Article	249	12	Education	156
3	Improvisation	214	13	Psychology	150
4	Music Education	167	14	Cognition	150
5	Art	156	15	Emotion	149
6	Male	150	16	Brain	148
7	Female	140	17	Innovation	146
8	Performance	131	18	Computational Creativity	145
9	Adult	119	19	Controlled Study	143
10	Music Therapy	116	20	Perception	133

We can quickly understand a field's status and development direction through keyword analysis. Based on the co-occurrence of keywords in VOSviewer, the most popular keyword is 'human' (370 occurrences), followed by 'article' (249), 'improvisation' (214), and 'music education' (167) (Table 7, Figures 15 and 16). After removing irrelevant keywords, a network comprising 174 that appeared at least 18 times was constructed, resulting in four distinct clusters.

- Cluster 1 (Red) contains 87 keywords: music education, personality, art, behavior, model, collaboration, evolution, intelligence, affect, COVID-19, authenticity, design, networks, emotion, youth, and curriculum.
- Cluster 2 (Green) includes 41 keywords: musician, improvisation, flow, divergent thinking, brain, memory, learning, emotion, human experiment, physiology, and neuroimaging.
- Cluster 3 (Blue) contains 31 keywords: human, male, controlled study, dancing, music therapy, art therapy, and significant clinical study.
- Cluster 4 (Yellow) has 15 keywords, including article, priority journal, esthetics, painting, imagination, and psychological aspect.

A volcano plot was created using CiteSpace to visually display how research hotspots have changed over time (Figure 17). This visualization indicates shifting focuses and emerging trends in the field, reflecting the dynamic nature of research in music creativity.

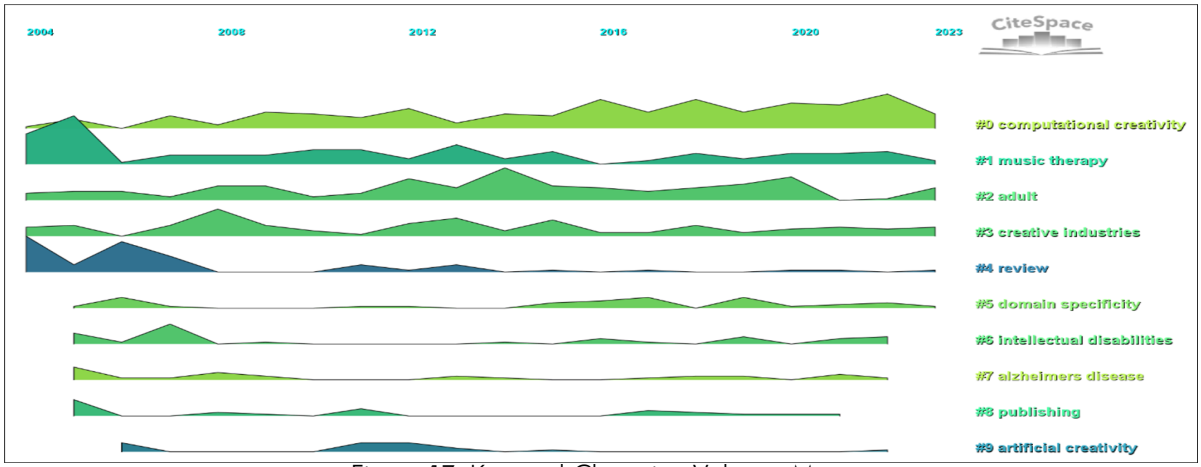

Figure 17: Keyword Clustering Volcano Map.

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Co–cited References and Keywords

Through CiteSpace, we identified 50 of the most significant citation bursts in music creativity. The reference with the highest burst strength (7.93) is Ana Luísa Pinho's "Addressing a Paradox: Dual Strategies for Creative Performance in Introspective and Extrospective Networks" (Pinho et al., 2015). This study on the neuroimaging of internally generated behaviors showed seemingly contradictory results in the dorsolateral prefrontal cortex (DLPFC). The findings from Pinho et al. have become a cornerstone in exploring creative cognition in music, prompting further investigation into the neural dynamics of creativity. DLPFC activation, deactivation, or even inactivation was observed compared to control conditions. On one hand, the prefrontal cortex is thought to exert top-down control over the generation of thoughts by inhibiting habitual responses.

However, when the prefrontal cortex is deactivated, it leads to a decrease in monitoring and focused attention. This, in turn, promotes spontaneous associations and the emergence of new insights. This sophisticated comprehension has enhanced the discussion on musical creation, emphasising the intricate interaction between organised thinking and spontaneity in creative processes. In this study, we have shown that the role of the prefrontal cortex in creative thinking is heavily influenced by the specific conditions of the experiment, particularly the goal of the task. We facilitated the improvisation of expert pianists on the piano keyboard while they underwent fMRI scanning and performing. This involved incorporating specific emotional content such as happiness or fear, as well as utilising specific keys related to tonal or harmonic mode. This research highlights the complex and diverse aspects of musical creativity, combining cognitive, emotional, and sensory elements. Our findings indicate that when comparing the tone setting condition to emotional settings, there was a decrease in neural activity in the right dorsolateral prefrontal cortex (DLPFC), dorsal premotor cortex, and inferior parietal lobule. In addition, during emotional states, the DLPFC exhibited functional connectivity with the default mode network. Conversely, during the tonal setting condition, the DLPFC was functionally connected to the premotor network. Hence, the findings provide evidence for the existence of two overarching cognitive strategies in creative problem-solving, which depend on extrospective and introspective brain circuits, respectively.

Out of the 510 most crucial burst keywords in the field, our attention was directed towards the top 50 with the greatest burst strength, as depicted in Figure 19. These keywords signify the current areas of intense research in the discipline and provide potential avenues for future research.

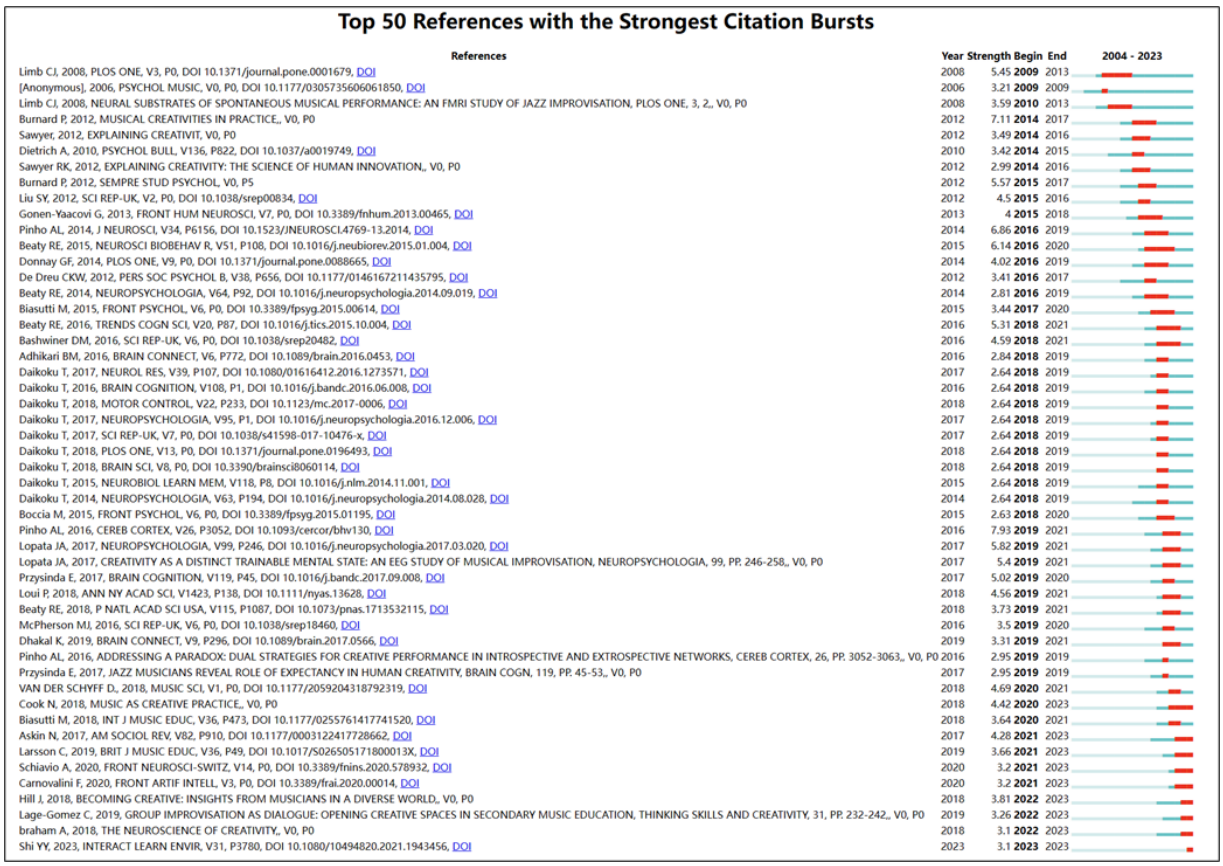

Figure 18: Cited Document Emergence Chart.

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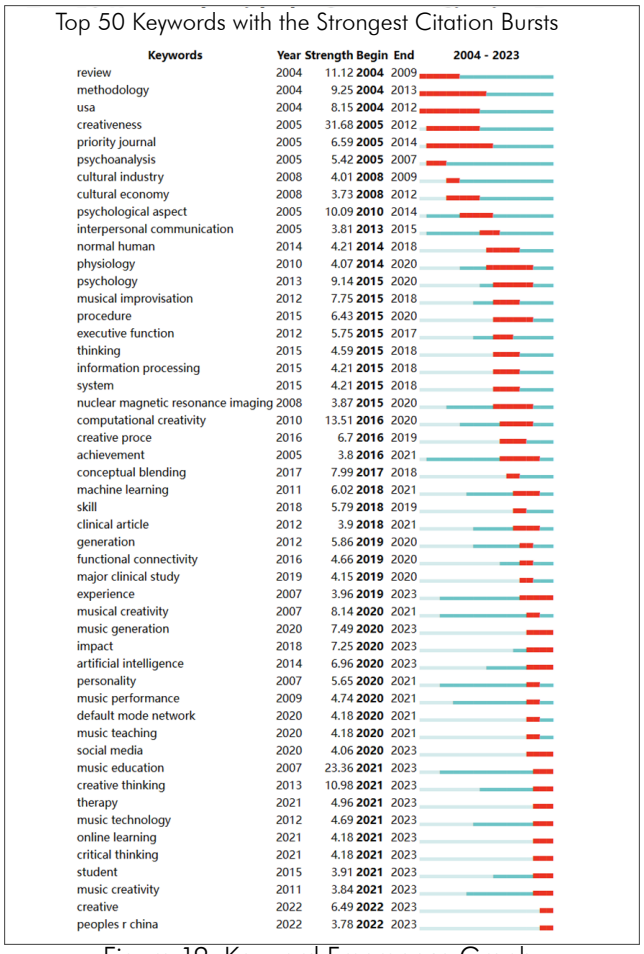

Figure 19: Keyword Emergence Graph.

DISCUSSION

In the last twenty years, there has been substantial expansion in the field of MC research. There are three clearly identifiable periods of growth. During the period from 2004 to 2012, the initial phase shown a consistent growth in the number of publications. During the second phase, spanning from 2013 to 2017, there was a notable acceleration in the rate of publishing increase. During the period of 2018 to 2022, the number of publications had a significant increase. The United States, United Kingdom, Australia, Spain, and China have made significant contributions to global MC research. The United States has consistently held the top position in terms of publications and citations, with the United Kingdom, Australia, Spain, and China following closely behind. The countries mentioned, Ozenc-Ira (2023), Schiavio and Benedek (2020), and Zioga et al. (2020), have made important contributions to the advancement of MC research and have helped to the overall expansion of the discipline.

Moreover, there has been a steady global increase in international research collaboration, as evidenced by the proportion of publications including international collaboration, which has risen from 4.7% in 1980 to 25.7% in 2021 (Aksnes & Sivertsen, 2023). The United States has robust collaborative relationships with nations including as Australia, China, Spain, and Italy (Creech et al., 2023). The United Kingdom engages in substantial collaboration with Germany, Russia, and France. These cooperative endeavours are essential for promoting research on a global scale, notably in the field of MC research. International collaboration enhances research performance, strengthens academic networks, and facilitates the global dissemination of local challenges and solutions. These relationships facilitate the harmonisation of worldwide involvement with unique attributes of individual countries, enabling the sharing of knowledge and promoting research in MC on a global scale.

Studies on music creativity have demonstrated varied topics and multidimensionality across various countries. The five leading countries have established distinct areas of focus and collaborative networks, highlighting diverse research interests and specialisations in the discipline. Michelle Conceison's paper analyses diversity, equity, and inclusion in the music industry. It focuses on the genres that were researched and proposes prospective areas for further research (Kolbe, 2023)@. Oscar Odena's study examines the concept of musical creativity and its implementation in various countries, with a particular focus on the significance of emotional involvement and its practical ramifications (Odena, 2023). The article authored by Rich Williams, Mark A. Runco, and Eric L. Berlow provides a comprehensive overview of the evolution of keyword themes in creativity research. The essay specifically examines the topics of workplace innovation, the influence of personality and intelligence on divergent thinking, and creative performance. The study cited in the article is conducted by Chen et al. (2023). The study conducted by Burnard and Cooke (2023) investigates the facilitation of intercultural understanding via the use of music and musical creativity in schools that have a diverse ethnic and cultural composition.

The realm of music creativity has undergone significant expansion over the years. The initial phase of expansion was marked by a gradual evolution in fundamental concepts and procedures (Lage-Gómez et al., 2023). Between 2009 and 2017, there was a steady rise in the number of study topics and methods, resulting in the growth and broadening of the discipline (Ozenc-Ira, 2023). Since 2018, there has been a significant increase in publications, which demonstrates the field's advancement and international acknowledgment (Dromey, 2023; Escobar et al., 2023). The rise can be ascribed to a rising focus on teaching and learning within a

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sociocultural framework (O'Dyke, 2023). The field has also experienced a change in perspective, now recognising creativity as a distributed phenomena. This involves studying the patterns of adaptive embodied interaction between various agents and the socio-material environment. The field of music creativity research has experienced a progression of fundamental development, expansion, and diversity, and has gained greater prominence in recent years.

Practical Implications

The substantial expansion of research on Music Creativity (MC) in the last twenty years, specifically the contributions from prominent countries such as the United States, United Kingdom, Australia, Spain, and China, has major practical consequences. The worldwide surge in research demonstrates a growing acknowledgment of the significance of MC in diverse domains, especially in the field of education. The prominent position of these countries in MC research underscores their impact in the area and implies that their discoveries and progress can serve as a blueprint for worldwide music education methods.

This tendency suggests a growing incorporation of MC-focused studies into educational curriculum on a global scale. Furthermore, the increase in global collaborations in MC research is evidence of the advantages of multinational partnerships. Collaborations of this nature enhance the quality and scope of research by including varied perspectives. This trend highlights the significance of promoting further partnerships, particularly in places that are currently lacking representation in MC research. The study conducted by Hargreaves (2012) has shown that the digital age has had a substantial influence on MC research. The pervasive integration of digital technology, internet platforms, and new media has revolutionised the processes of music creation, distribution, and consumption. The advent of this digital revolution implies a change in music education and production, requiring the adjustment to these technological improvements. It provides new opportunities for utilising technology in teaching music creativity, enhancing the accessibility of education, and integrating digital tools into creative expression.

The extensive range of topics explored by the leading countries in music creativity research suggests a broadening field of study, which will inspire future research to investigate various facets of music creativity. Expanding the scope of attention can result in a more inclusive comprehension of musical creativity, which is advantageous for educators, researchers, and practitioners. To summarise, the rapid and ongoing development of MC research in the past twenty years has significant implications for educational methods, collaborative research, technological integration, and future research orientations. This study emphasises the significance of a comprehensive and worldwide approach to comprehending and improving music creativity. It establishes a strong basis for future investigations and advancements in this sector.

CONCLUSION AND RECOMMENDATIONS

The field of Music Creativity (MC) was nascent in the early 20th century, experienced a slow growth until 2009, and witnessed a significant surge in publishing output in 2018. The United States, United Kingdom, Australia, Spain, and China are the nations with the most significant number of publications. The United States dominates the subject with its extensive number of publications, frequent citations, and central position, establishing it as the dominant country in this domain. Scholars have minimal research collaboration, and institutions primarily interact with domestic counterparts. There is a demand for enhanced collaboration between national and global organisations to overcome academic obstacles.

The knowledge architecture of MC is become increasingly intricate. Initially, research on machine consciousness is progressing rapidly, establishing strong interdisciplinary links with fields like as psychology, brain science, neuroscience, education, sociology, anthropology, arts, and computer science. Furthermore, initial investigations primarily concentrated on the neural network structure of the brain that develops during improvisation, namely the physiological process responsible for the production of musical creativity. Contemporary literature has begun to emphasise the integration of music education with MC, specifically addressing educational concerns related to MC. Furthermore, there is a greater emphasis in literature on the MC challenges faced by musicians in professional music performances, while less attention is given to the MC of regular individuals, such as students, who are not involved in the music profession. The literature explores various subjects related to improvisation, including the neurobiology behind it, the dynamics of contact and collaboration, the role of education in music composition, computer-generated music, music therapy, and the impact of creativity on music performance.

Research Limitations and Future Work

The essay has identified crucial topics for progress in research on Musical Creativity (MC), emphasising the shortcomings of present studies and the avenues for future investigation. An in-depth analysis of these areas exposes deficiencies in the current body of research and delineates a strategic path for future

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academic pursuits. An important constraint in the existing field of MC research is its primary emphasis on professional musicians, frequently neglecting the creative processes and educational requirements of non-professionals. This neglect implies a wider scope of musical ingenuity that has not been thoroughly explored, especially in terms of how MC is expressed and can be cultivated beyond professional domains. By focusing on the examination of musical creativity in everyday settings among non-professionals and students, we can gain a deeper understanding of the widespread nature and variety of this phenomenon. This research can provide significant insights into how to promote creativity among different groups of people. Moreover, although improvisation has garnered significant focus, it is clear that there is a distinct requirement to expand the research scope to encompass additional facets of musical creativity. Engaging in the activities of creative listening, composition, and complete performance can lead to a more comprehensive understanding of MC, since it encompasses various aspects. These topics have the potential to enhance our understanding of how individuals interact with, value, and produce music, hence improving overall musical creativity.

The need for increased and comprehensive international cooperation, especially in terms of institutional globalisation, is an essential path for the future. Collaboration of this nature has the potential to expedite the exchange of knowledge and approaches between different countries, hence promoting a more inclusive and complete worldwide research community with a specific focus on MC. By surpassing geographical and disciplinary limitations, the field can gain advantages from a wide range of cultural viewpoints and inventive research methods, which could potentially result in revolutionary breakthroughs in MC. Essentially, the field of MC research is on the verge of substantial growth, with the goal of addressing current deficiencies and venturing into uncharted areas. To achieve a more inclusive and thorough knowledge of musical creativity, the field should expand its research to include non-professional musicians, explore a wider range of creative elements, and foster global collaboration. These directions emphasise the possibilities for future research and emphasise the significance of using diverse approaches to fully understand musical complexity.

REFERENCES

Adamaszek, M., Cattaneo, Z., Ciricugno, A., & Chatterjee, A. (2022). The cerebellum and beauty: the impact of the cerebellum in art experience and creativity. In *The emotional cerebellum* (Vol. 1378, pp. 213-233). Springer. https://doi.org/10.1007/978-3-030-99550-8_14

Aguayo, B. B., Ruano, C. A., & Vallejo, A. P. (2021). Multiple intelligences: Educational and cognitive development with a guiding focus. *South African Journal of Education, 41*(2), 1-10. https://doi.org/10.15700/saje.v41n2a1828

Aksnes, D. W., & Sivertsen, G. (2023). Global trends in international research collaboration, 1980-2021. *Journal of Data and Information Science, 8*(2), 26-42. https://doi.org/10.2478/jdis-2023-0015

Bagley, M. J., Gifford, E., & McKelvey, M. (2022). The evolution of niche: variety in knowledge networks in the global music industry. *Industry and Innovation, 29*(3), 425-462. https://doi.org/10.1080/13662716.2021.2007758

Bassachs, M., Cañabate, D., Nogué, L., Serra, T., Bubnys, R., & Colomer, J. (2020). Fostering critical reflection in primary education through STEAM approaches. *Education Sciences, 10*(12), 384. https://doi.org/10.3390/educsci10120384

Blackburn, A., & Hewitt, D. (2020). Fostering creativity and collaboration in a fully online tertiary music program. *International Journal on Innovations in Online Education, 4*(2), 1-14. https://doi.org/10.1615/IntJInnovOnlineEdu.2020035099

Burnard, P. (2012a). *Musical Creativities in Practice*. Oxford University Press. https://doi.org/10.1093/acprof:oso/9780199583942.001.0001

Burnard, P., & Cooke, C. (2023). Troubling Terrains of Diffractive Re-readings: Performing Transdisciplinary Re-matterings of Music, Mathematics and Visual Art Materiality. In *Diffracting New Materialisms: Emerging Methods in Artistic Research and Higher Education* (pp. 235-263). Springer. https://doi.org/10.1007/978-3-031-18607-3_14

Burnard, S. (2012b). *Developing children's behaviour in the classroom: A practical guide for teachers and students*. Routledge. https://doi.org/10.4324/9780203046685

Cavas, B., & Cavas, P. (2020). Multiple Intelligences Theory—Howard Gardner. In *B. Akpan & T. J. Kennedy (Eds.), Science Education in Theory and Practice: An Introductory Guide to Learning Theory* (pp. 405-418). Springer, Cham. https://doi.org/10.1007/978-3-030-43620-9_27

Chen, Q., Beaty, R. E., & Qiu, J. (2020). Mapping the artistic brain: Common and distinct neural activations associated with musical, drawing, and literary creativity. *Human Brain Mapping, 41*(12), 3403-3419. https://doi.org/10.1002/hbm.25025

Chen, Q., Christensen, A. P., Kenett, Y. N., Ren, Z., Condon, D. M., Bilder, R. M., Qiu, J., & Beaty, R. E. (2023). Mapping the creative personality: A psychometric network analysis of highly creative artists and scientists. *Creativity Research Journal, 35*(3), 455-470. https://doi.org/10.1080/10400419.2023.2184558

ArtsEduca 39, April 2024 | 10.58262/ArtsEduca.3909 | pp. 107-128

Cope, D. (2021). Music, Artificial Intelligence and Neuroscience. In *E. R. Miranda (Ed.), Handbook of Artificial Intelligence for Music: Foundations, Advanced Approaches, and Developments for Creativity* (pp. 163-194). Springer, Cham. https://doi.org/10.1007/978-3-030-72116-9_7

Creech, A., Larouche, K., Generale, M., & Fortier, D. (2023). Creativity, music, and quality of later life: A systematic review. *Psychology of Music, 51*(4), 1080-1100. https://doi.org/10.1177/0305735620948114

Dietrich, A., & Zakka, S. (2023). Education, neuroscience, and types of creativity. *Future in Educational Research, 1*(1), 63-71. https://doi.org/10.1002/fer3.7

Dromey, C. (2023). *The Routledge Companion to Applied Musicology*. Routledge. https://doi.org/10.4324/9781003042983

Escobar, S. A., Chaudhary, A., Ehrlich, D., & Smith, A. M. (2023). Creativity and Consistency in Musical Perception of Tangible Objects. *UCSC Technical Reports*. https://tr.soe.ucsc.edu/sites/default/files/technical-reports/UCSC-SOE-23-08.pdf

Faber, S. E., & McIntosh, A. R. (2020). Towards a standard model of musical improvisation. *European Journal of Neuroscience, 51*(3), 840-849. https://doi.org/10.1111/ejn.14567

Gande, N. (2022). Neural phenomenon in musicality: The interpretation of dual-processing modes in melodic perception. *Frontiers in Human Neuroscience, 16*, 823325. https://doi.org/10.3389/fnhum.2022.823325

Gardner, R. C. (1983). Learning another language: A true social psychological experiment. *Journal of language and social psychology, 2*(2-3-4), 219-239. https://doi.org/10.1177/0261927X830020020

Green, A. E., Beaty, R. E., Kenett, Y. N., & Kaufman, J. C. (2023). The process definition of creativity. *Creativity Research Journal,* 1-29. https://doi.org/10.1080/10400419.2023.2254573

Guo, Q., & Chueachainat, K. (2024). Cross-Cultural Communication and Co-Directional Theory: Assessing the Impact of Cultural Background on Communication Efficacy Among International Students in Malaysia. *Journal of Advances in Humanities Research, 3*(1), 22-40. https://doi.org/10.56868/jadhur.v3i1.203

Hargreaves, D. J. (2012). Musical imagination: Perception and production, beauty and creativity. *Psychology of Music, 40*(5), 539-557. https://doi.org/10.1177/0305735612444893

Hendriks, L. H., Steenbeek, H. W., Bisschop Boele, E. H., & van Geert, P. L. (2023). Promoting creative autonomy support in school music education: An intervention study targeting interaction. *Frontiers in Education, 7,* 1102011. https://doi.org/10.3389/feduc.2022.1102011

Huovinen, E. (2021). Theories of creativity in music: Students' theory appraisal and argumentation. *Frontiers in Psychology, 12*, 612739. https://doi.org/10.3389/fpsyg.2021.612739

Hvidtfeldt, D. (2023). Musical Participation in Studies of Creativity. *Qualitative Studies, 8*(1), 314-333. https://doi.org/10.7146/qs.v8i1.136814

Kashina, N., Pavlov, D., & Li, H. (2020). Music-digital technologies as a means of developing creative independence of students of colleges and higher schools in China and Russia. In *International Scientific conference "digitalization of education: History, trends and prospects"(DETP 2020)* (pp. 27-31). Atlantis Press. https://doi.org/10.2991/assehr.k.200509.006

Kaufman, J. C., & Beghetto, R. A. (2023). Where is the When of Creativity?: Specifying the Temporal Dimension of the Four Cs of Creativity. *Review of General Psychology, 27*(2), 194-205. https://doi.org/10.1177/10892680221142803

Kolbe, K. (2023). Challenges of Diversity Strategies in the "Western" Classical Music Sector. In *A. Bull & C. Scharff (Eds.), Voices for Change in the Classical Music Profession: New Ideas for Tackling Inequalities and Exclusions* (pp. 69–80). Oxford University Press. https://doi.org/10.1093/oso/9780197601211.003.0006

Lage-Gómez, C., Chatelain, S., & Cremades-Andreu, R. (2023). Toward conceptualizations of musical creativities in secondary education: An integrative literature review between 1990 and 2020. *Research Studies in Music Education,* 1321103X231181559. https://doi.org/10.1177/1321103X231181559

Loui, P. (2021). Neuroscience of Musical Improvisation. In *E. R. Miranda (Ed.), Handbook of Artificial Intelligence for Music: Foundations, Advanced Approaches, and Developments for Creativity* (pp. 97-115). Springer, Cham. https://doi.org/10.1007/978-3-030-72116-9_5

Massy, P. J., & Sembiante, S. F. (2023). Pedagogical practices, curriculum development, and student experiences within postsecondary music education: A systematic literature review. *Research Studies in Music Education, 45*(3), 600-615. https://doi.org/10.1177/1321103X221128172

Miller, C. L., Manderfeld, M., & Harsma, E. A. (2019). Learning Theories: Multiple Intelligences. *All Resources, 142*. https://cornerstone.lib.mnsu.edu/all/142

Moneta, G. B., & Csikszentmihalyi, M. (1996). The effect of perceived challenges and skills on the quality of subjective experience. *Journal of Personality, 64*(2), 275-310. https://doi.org/10.1111/j.1467-6494.1996.tb00512.x

ArtsEduca 39, April 2024 | 10.58262/ArtsEduca.3909 | pp. 107-128

Ng, D. T. K., Ng, E. H. L., & Chu, S. K. W. (2022). Engaging students in creative music making with musical instrument application in an online flipped classroom. *Education and information Technologies, 27*(1), 45-64. https://doi.org/10.1007/s10639-021-10568-2

Nijs, L., Grinspun, N., & Fortuna, S. (2024). Developing Musical Creativity Through Movement: Navigating the Musical Affordance Landscape. *Creativity Research Journal,* 1-25. https://doi.org/10.1080/10400419.2023.2299159

Norsworthy, C., Jackson, B., & Dimmock, J. A. (2021). Advancing our understanding of psychological flow: A scoping review of conceptualizations, measurements, and applications. *Psychological Bulletin, 147*(8), 806–827. https://doi.org/10.1037/bul0000337

O'Dyke, N. (2023). *African Performance Epistemology: Fundamental Indigenous Creative Theories and Philosophies for Application in Contemporary Music Education* [Doctoral Dissertation, University of Limerick]. https://doi.org/10.34961/researchrepository-ul.22567732.v1

Odena, O. (2023). Developing higher music education students' creativity. In *A. Sangiorgio (Ed.), Creative learning, Creative Teaching, and Teaching for Group Creativity in Music Education* (pp. 20-31). University of Music and Theatre Munich: Munich, Germany. https://nbn-resolving.org/urn:nbn:de:bvb:m29-0000010661

Ozenc-Ira, G. (2023). Mapping research on musical creativity: A bibliometric review of the literature from 1990 to 2022. *Thinking Skills and Creativity, 48*, 101273. https://doi.org/10.1016/j.tsc.2023.101273

Pearce, P. L. (2005). Tourist Behaviour: Themes and Conceptual Schemes. Multilingual Matters. https://doi.org/10.21832/9781845410247

Pinho, A. L., Ullén, F., Castelo-Branco, M., Fransson, P., & de Manzano, Ö. (2015). Addressing a paradox: dual strategies for creative performance in introspective and extrospective networks. *Cerebral Cortex, 26*(7), 3052-3063. https://doi.org/10.1093/cercor/bhv130

Pohjannoro, U. (2022). Embodiment in composition: 4E theoretical considerations and empirical evidence from a case study. *Musicae Scientiae, 26*(2), 408-425. https://doi.org/10.1177/1029864920961447

Rahman, S. S., Christensen, K., Jensen, H. J., Vuust, P., & Bhattacharya, J. (2021). Neural markers for musical creativity in Jazz improvisation and classical interpretation. *bioRxiv, 427648*. https://doi.org/10.1101/2021.02.12.427648

Ramírez-Moreno, M. A., Cruz-Garza, J. G., Acharya, A., Chatufale, G., Witt, W., Gelok, D., Reza, G., & Contreras-Vidal, J. L. (2022). Brain-to-brain communication during musical improvisation: a performance case study. *F1000Research, 11*, 989. https://doi.org/10.12688/f1000research.123515.4

Saraswati, D., Wahidmurni, W., & Zuhriyah, I. A. (2023). Thematic Learning Based on Multiple Intelligences in Developing Student Creativity at Primary School Plus Al-Kautsar Malang. *At-Thullab: Jharnal Penditikan as Guru Madrasa Ibditai, 7*(1), 1-17. http://repository.uin-malang.ac.id/12815/7/12815.pdf

Sawyer, R. K., & Henriksen, D. (2024). *Explaining Creativity: The Science of Human Innovation*. Oxford University Press. https://global.oup.com/academic/product/explaining-creativity-9780199737574

Schiavio, A., & Benedek, M. (2020). Dimensions of Musical Creativity. *Frontiers in Neuroscience, 14*, 578932. https://doi.org/10.3389/fnins.2020.578932

Schiavio, A., Moran, N., Antović, M., & van der Schyff, D. (2022). Grounding creativity in music perception? *A multidisciplinary conceptual analysis. Music & Science, 5*, 20592043221122949. https://doi.org/10.1177/20592043221122949

Shi, Y. (2023). The use of mobile internet platforms and applications in vocal training: Synergy of technological and pedagogical solutions. *Interactive Learning Environments, 31*(6), 3780-3791. https://doi.org/10.1080/10494820.2021.1943456

Song, Y., Punchatree, N., & Tosati, S. (2023). Development of a Causal Model of Factors Affecting Learner Satisfaction with Online Teaching of Primary School Students in Beijing China. *Journal of Advances in Humanities Research, 2*(2), 47-70. https://doi.org/10.56868/jadhur.v2i2.149

Stahnisch, F. W. (2023). Brain Research and Art?—A Short History of Neurological Research and Creative Expression. In *A. Richard, M. Pelowski, & B. T. Spee (Eds.), Art and Neurological Disorders: Illuminating the Intersection of Creativity and the Changing Brain* (pp. 3-24). Springer. https://doi.org/10.1007/978-3-031-14724-1_1

Sternberg, R. J. (2021). Toward a theory of musical intelligence. *Psychology of Music, 49*(6), 1775-1785. https://doi.org/10.1177/0305735620963765

Stevens Jr, C. E., & Zabelina, D. L. (2019). Creativity comes in waves: an EEG-focused exploration of the creative brain. *Current Opinion in Behavioral Sciences, 27*, 154-162. https://doi.org/10.1016/j.cobeha.2019.02.003

Strandgaard Pedersen, J., Slavich, B., & Khaire, M. (2020). Technology and Creativity: Production, Mediation and Evaluation in the Digital Age. In *J. Strandgaard Pedersen, B. Slavich, & M. Khaire (Eds.), Technology and Creativity: Production, Mediation and Evaluation in the Digital Age* (pp. 1-11). Springer International Publishing. https://doi.org/10.1007/978-3-030-17566-5_1

Vaisvaser, S. (2021). The embodied-enactive-interactive brain: Bridging neuroscience and creative arts therapies. *Frontiers in Psychology, 12*, 634079. https://doi.org/10.3389/fpsyg.2021.634079

ArtsEduca 39, April 2024 | 10.58262/ArtsEduca.3909 | pp. 107-128

van der Schyff, D., & Schiavio, A. (2022). Musical Creativity in Performance. In *G. E. McPherson (Ed.), The Oxford Handbook of Music Performance, Volume 1* (pp. 484–509). Oxford Academic. https://doi.org/10.1093/oxfordhb/9780190056285.013.30

Van Eck, N., & Waltman, L. (2010). Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics, 84*(2), 523-538. https://doi.org/10.1007/s11192-009-0146-3

Vartanian, O. (2022). Neuroscience of artistic creativity. In *M. Skov & M. Nadal (Eds.), The Routledge International Handbook of Neuroaesthetics* (pp. 507-525). Routledge. https://doi.org/10.4324/9781003008675-29

Walzer, D. (2023). Towards an understanding of creativity in independent music production. *Creative Industries Journal, 16*(1), 42-55. https://doi.org/10.1080/17510694.2021.1960705

Whitney, D. (2018). *Creativity in Context: Update to the Social Psychology of Creativity*. Routledge. https://doi.org/10.4324/9780429501234

Woody, R. H. (2021). Music education students' intrinsic and extrinsic motivation: A quantsitative analysis of personal narratives. *Psychology of Music, 49*(5), 1321-1343. https://doi.org/10.1177/0305735620944224

Xiao, X., Tan, J., Liu, X., & Zheng, M. (2023). The dual effect of background music on creativity: perspectives of music preference and cognitive interference. *Frontiers in Psychology, 14*, 1247133. https://doi.org/10.3389/fpsyg.2023.1247133

Zatorre, R. J., Chen, J. L., & Penhune, V. B. (2007). When the brain plays music: auditory–motor interactions in music perception and production. *Nature Reviews Neuroscience, 8*(7), 547-558. https://doi.org/10.1038/nrn2152

Zavadska, G., & Rauduvaite, A. (2020). Formation and development of children's skills of imrovisation and composition at sol-fa lessons. Society. Integration. Education. *Proceedings of the International Scientific Conference, 5*, 817-826. https://doi.org/10.17770/sie2020vol5.5015

Zhang, C. (2023). The role of musical improvisation in the development of creative thinking in children (El rol de la improvisación musical en el desarrollo del pensamiento creativo infantil). *Culture and Education, 35*(3), 535-561. https://doi.org/10.1080/11356405.2023.2200528

Zioga, I., Harrison, P. M., Pearce, M. T., Bhattacharya, J., & Luft, C. D. B. (2020). From learning to creativity: Identifying the behavioural and neural correlates of learning to predict human judgements of musical creativity. *NeuroImage, 206,* 116311. https://doi.org/10.1016/j.neuroimage.2019.116311

ArtsEduca 39, April 2024 | 10.58262/ArtsEduca.3909 | pp. 107-128