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Global Dynamics of Visual Literacy Scholarship in Higher Education: Insights from a Bibliometric Analysis

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Abstrak:
Visual literacy has become a central competency in higher education as digital and multimodal communication increasingly shapes learning practices. Although its pedagogical relevance has been widely recognized, existing research remains fragmented and lacks a comprehensive global mapping of how visual literacy scholarship has evolved—particularly in terms of intellectual structure, collaboration patterns, and thematic development. This study employs a bibliometric approach to analyze global research trends on visual literacy in higher education using Scopus-indexed publications from 2019 to 2024. Bibliometric indicators related to publication growth, productivity, citation impact, and international collaboration were examined using RStudio (Bibliometrix) and VOSviewer. Findings show a significant rise in publication output, with more than 177 documents published in 2024—representing the highest annual growth within the examined period. Indonesia, particularly through Universitas Pendidikan Indonesia, shows strong research productivity, followed by Texas Tech University and the University of Nevada. Despite increasing contributions from Asian and Western institutions, international collaboration remains limited, especially among Southeast Asian universities. This study demonstrates that visual literacy has developed into an increasingly dynamic and interdisciplinary research field. The novel contribution of this study lies in offering the first comprehensive, data-driven global mapping of visual literacy scholarship in higher education, revealing its publication dynamics, collaborative structures, and emerging thematic directions. Strengthening international partnerships is essential for advancing theoretical development and pedagogical innovation in visual literacy research.

Keyword: bibliometric analysis; higher education; research trends, scholarly collaboration; visual literacy.

Introduction

In today's higher education landscape, dominated by visual and multimodal information, *visual literacy* has become a core competency for both educators and students. It involves the ability to interpret, analyze, and create visual representations skills crucial for constructing and communicating meaning in academic contexts (Avgerinou & Pettersson, 2011; Serafini, 2014). As digital technologies reshape learning and communication, the integration of visual formats such as infographics, concept maps, and interactive media has transformed how knowledge is produced and shared (Barrett & Liu, 2016; Bian & Ji, 2021; Ligorio, 2001). Accordingly, the Association College and Research Libraries (2012) emphasizes that visually literate individuals must not only understand and use visual information ethically but also generate purposeful visual messages across contexts.

Despite the growing importance of visual literacy, research in this field remains fragmented—often focusing on conceptual definitions or classroom-based practices rather than examining its broader scholarly development. Few studies have systematically mapped how *visual literacy research* has evolved globally within higher education. Addressing this gap, the present study employs a bibliometric approach to analyze trends, influential contributors, and collaboration networks in visual literacy scholarship between 2014 and 2024.

Previous research has examined visual literacy from both conceptual and pedagogical perspectives. Beauchamp and Kennewell (2010) emphasized visual representation in technology-based pedagogy, while Brumberger (2011) identified an imbalance between verbal and visual literacy in curricula and advocated for broader integration across disciplines. Recent studies have transitioned toward applied approaches—such as the pedagogical framework proposed by Avgerinou and Pettersson (2020) and the use of digital infographics to enhance scientific understanding (Qin and Tan, 2022) highlighting that visual literacy extends beyond technical ability to include critical thinking and cross-media communication.

Although previous research has provided valuable insights into visual literacy, much of the literature remains conceptually and methodologically fragmented. Earlier studies tended to emphasize specific dimensions—such as visual representation in technology-enhanced pedagogy or the imbalance between verbal and visual competencies in curricula—without fully integrating these perspectives into a broader theoretical understanding of how visual literacy functions within higher education. More recent work has begun to expand its scope, illustrating that visual literacy encompasses not only technical decoding skills but also critical interpretation, visual reasoning, and the ability to construct multimodal meaning. However, these studies often operate in isolated disciplinary silos, offering rich but narrow contributions. What is still lacking is a coherent synthesis that connects these diverse strands—conceptual, pedagogical, cognitive, and technological—into a holistic picture of how visual literacy research has evolved across contexts and over time. This fragmentation underscores the need for an overarching, data-driven analysis that can consolidate the field's intellectual development.

However, most existing studies are limited to local contexts or theoretical discussions, with few offering comprehensive quantitative insights into the global evolution of visual literacy research. Previous reviews (e.g., Serafini, 2014; Lim & Nekmat, 2020) primarily addressed conceptual and pedagogical aspects without adopting a bibliometric perspective that could systematically map publication trends, thematic evolution, and collaboration networks.

Despite the growing body of literature, a clear gap persists: there is no comprehensive global analysis that systematically captures how visual literacy scholarship in higher education has evolved over time, what intellectual structures underpin the field, and how collaboration networks shape its development. Most existing studies focus on conceptual definitions or classroom-based interventions, leaving limited understanding of the broader scientific landscape that informs these pedagogical practices. Accordingly, this study addresses the following problem statement: the global patterns, influential contributors, and thematic evolution of visual literacy research in higher education remain underexplored and insufficiently mapped using quantitative evidence. To respond to this gap, the present research formulates three objectives:

1) To analyze the growth and distribution of visual literacy publications in higher education from 2014 to 2024;
2) To identify the most productive authors, institutions, and countries contributing to the field; and

3) To explore international collaboration networks and emerging thematic trends that shape the current research landscape.

Using bibliometric techniques applied to Scopus data—supported by visualization tools such as VOSviewer and RStudio—this study aims to offer a comprehensive, data-driven overview of the global development of visual literacy scholarship. The insights generated are expected to guide curriculum development, inform cross-institutional collaboration strategies, and strengthen theoretical and policy frameworks related to visual literacy in higher education.

Literature Review

The concept of visual literacy has evolved from its early association with educational technology and art education into a multidimensional competence required in today's digital learning environments. Debes (1969) initially defined visual literacy as the ability to "read" and "write" visual messages, focusing on perceptual and representational skills. However, later scholars expanded this notion to encompass cognitive, aesthetic, and critical dimensions. Avgerinou & Pettersson, (2011) conceptualized visual literacy as a *systematic and cognitive process* involving perception, interpretation, and the creation of visual meaning—thus shifting the focus from mere technical decoding to the intellectual construction of knowledge through visual forms. This theoretical expansion reflects a paradigm shift from viewing visual literacy as a *skill set* to understanding it as a *complex literacy practice* embedded in meaning-making and communication.

The Association of College and Research Libraries (ACRL, 2012) advanced this perspective by developing the *Visual Literacy Competency Standards for Higher Education*, which situate visual literacy within an ethical, legal, and socio-cultural framework. Unlike Debes' perceptual emphasis or Avgerinou and Pettersson's cognitive lens, the ACRL framework foregrounds the contextual and moral responsibilities of visual information use. These distinctions illustrate that visual literacy is not a monolithic construct but a continuously evolving field that integrates psychological, educational, and cultural dimensions.

Despite this theoretical development, existing frameworks often remain fragmented. Earlier studies focus predominantly on definitional or pedagogical perspectives, with limited attempts to synthesize how visual literacy has been operationalized across disciplines or mapped as a coherent field of study. Consequently, there is a lack of critical integration between the *cognitive* and *socio-cultural* dimensions of visual literacy—particularly within the context of higher education research. Addressing this theoretical fragmentation requires a broader, evidence-based examination of how visual literacy has evolved globally, which this bibliometric study seeks to accomplish.

From a pedagogical perspective, visual literacy has become a fundamental component of 21st-century learning frameworks (Kędra & Žakevičiūtė, 2019; Serafini, 2014). It enhances students' critical thinking, analytical reasoning, and multimodal communication skills—competencies that are essential in digital learning environments. Visual literacy instruction allows learners to deconstruct visual messages and construct meaning across various media platforms, positioning it as a key literacy for digital-age communication.

Empirical studies have further demonstrated the pedagogical impact of visual literacy across disciplines. Qin and Tan (2022) found that the use of digital infographics improved science students' conceptual understanding and engagement, while Beauchamp and Kennewell (2010) emphasized that visual representation supports interactivity and active learning in technology-enhanced classrooms. In professional education, Chisolm et al. (2021) and Kagan et al. (2022) showed that visual arts–based instruction enhances empathy, observation, and reflective thinking among medical students. These findings

collectively affirm that visual literacy contributes not only to learning outcomes but also to affective and metacognitive development.

At the global level, research increasingly situates visual literacy within broader frameworks such as information literacy, media literacy, and digital literacy (Livingstone, 2004; Lim & Nekmat, 2020). This convergence reflects a growing recognition that visual meaning-making involves not only decoding imagery but also understanding how visuals operate within digital, social, and cultural systems. However, despite this integration, most studies have treated these literacies as separate domains, with limited cross-analysis of how they intersect and evolve collectively within higher education contexts.

Recent scholarship also highlights the growing importance of technological mediation in visual literacy development. For instance, Bian and Ji (2021) investigated how digital communication design tools enhance students' creative competencies, while Riley (2024) proposed the concept of *visualcy* as the cognitive foundation of literacy and numeracy. Similarly, Avgerinou and Pettersson (2020) emphasized that visual literacy in online and blended learning environments requires pedagogical frameworks that integrate visual thinking with digital design skills. Nevertheless, these studies tend to focus on local implementations or theoretical propositions without providing a systematic overview of how visual literacy research has developed globally.

In summary, while existing research has enriched the conceptual and pedagogical understanding of visual literacy, it remains fragmented across disciplines, lacks longitudinal synthesis, and seldom maps the intellectual structure of the field. This gap underscores the need for a comprehensive bibliometric analysis that can quantitatively trace publication trends, collaborative networks, and emerging themes in visual literacy scholarship within higher education. By addressing this gap, the present study contributes to consolidating the theoretical and empirical foundations of visual literacy as an evolving global research domain.

Method

This study employed a bibliometric analysis approach to examine global research trends on visual literacy in higher education. Bibliometric analysis is a quantitative method that systematically maps and evaluates scientific publications using statistical indicators derived from bibliographic metadata (Donthu et al., 2021). It enables the identification of publication dynamics, intellectual structures, and collaboration patterns across the research domain while minimizing subjective bias inherent in traditional literature reviews.(Zupic & Čater, 2014).

The analysis utilized RStudio (Bibliometrix package) and VOSviewer to process, analyze, and visualize bibliometric data. Several key indicators were applied to provide a comprehensive overview of the research landscape. First, *publication growth analysis* was conducted to measure the annual progression of research output from 2014 to 2024. Second, *co-authorship analysis* was employed to examine collaboration patterns among authors, institutions, and countries, allowing the identification of major contributors and research networks. Third, *keyword co-occurrence analysis* was used to detect thematic linkages, research clusters, and emerging trends related to visual literacy. In addition, *citation and co-citation analyses* were performed to identify the most influential authors, journals, and publications shaping the intellectual structure of the field. Finally, *institutional and country mapping* was carried out to visualize the geographic distribution of research productivity and international collaboration.

Compared to other review methodologies such as meta-analysis or systematic literature review, bibliometric analysis offers the advantage of incorporating a larger corpus of publications while providing objective,

data-driven insights into the evolution of a research field (Fauzi et al., 2023). Accordingly, this methodological design ensures a transparent, replicable, and comprehensive understanding of how visual literacy scholarship in higher education has developed over the past decade.

Search Strategy

The bibliometric analysis was conducted using the Scopus database, chosen because it encompasses a broader range of scientific publications than other databases such as *Web of Science* or *PubMed*, making it more suitable for interdisciplinary topics like visual literacy, visual thinking, social media branding, and graphic media development. Relevant articles were identified using the following search string:

(TITLE-ABS-KEY ("visual literacy") OR TITLE-ABS-KEY ("literacy visual") OR TITLE-ABS-KEY ("Visual thinking") AND TITLE-ABS-KEY ("higher education")) AND PUBYEAR > 2014 AND PUBYEAR < 2024.

This query ensured that the retrieved documents were directly related to visual literacy within the context of higher education.

Inclusion and Exclusion Criteria

To capture the most recent trends, this study only included publications released between 2019 and 2024. The results were further limited to English-language journal articles. Excluded publications comprised books, editorials, letters, notes, and short surveys.

The initial Scopus search yielded 793 documents. After removing duplicates and filtering out irrelevant items based on the inclusion and exclusion criteria, the remaining articles were assessed for relevance by reviewing their titles, keywords, and abstracts.

Result and Discussion

Annual Scientific Production

The analysis of annual publications on visual literacy in higher education revealed a temporary decline in 2020, followed by a sharp and sustained increase through 2024 (Figure 1). Specifically, 107 articles were published in 2019, decreasing to 97 in 2020 (–9.35%), before rising to 177 in 2024—an overall growth of more than 65% within the examined period. This pattern reflects the rapid expansion of scholarly attention toward visual literacy after the COVID-19 pandemic, when visual and digital media became central to online and hybrid learning environments.

Figure 1.
Annual Scientific Production

The substantial rise between 2021 and 2024 indicates that visual literacy has evolved from a niche pedagogical topic into a broader interdisciplinary research domain intersecting with digital literacy, media

education, and educational technology. The increasing number of studies during this period also suggests a shift in institutional and policy priorities, as universities began integrating multimodal learning competencies into their curricula and research agendas. Hence, the growth of publication output does not merely signal quantitative expansion but also reflects a qualitative transformation in how visual literacy is positioned as a core element of 21st-century higher education.

Average Citations per Year

Citation trend analysis revealed that while the overall number of publications has increased, citation density has gradually declined, with MeanTCperArt decreasing from 14.21 (2019) to 2.65 (2024). This pattern is typical in emerging and fast-expanding research areas, where new articles proliferate faster than citation accumulation can occur. The early dominance of works from 2019–2020 indicates that foundational or conceptual studies during this period continue to shape subsequent discourse in visual literacy scholarship.

However, the declining MeanTCperYear after 2020 also implies a fragmentation of research themes and methodological approaches. As the field diversifies into various subtopics—such as visual communication design, information visualization, and multimodal pedagogy—citations become more dispersed. This trend highlights a developmental stage of the field transitioning from consolidation toward diversification, signaling opportunities for meta-synthesis and theoretical integration in future research.

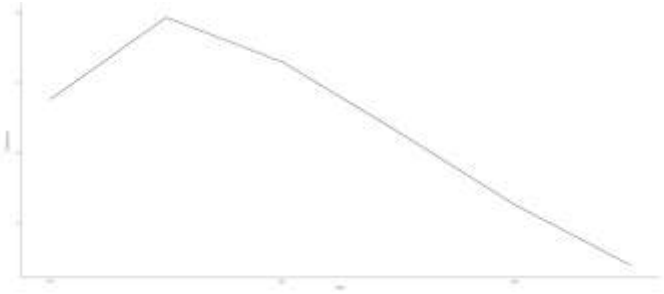

Figure 2.
Average Citations per Year

Most Relevant Authors

Figure 3 identifies Chisolm as the most productive author, followed by Offerdahl, Riley, Ruiz Gallardo, Stenliden, and Wang. The presence of authors from diverse disciplinary backgrounds—including medical education (Chisolm), science education (Offerdahl), and communication design (Riley)—illustrates the cross-disciplinary character of visual literacy research.

The concentration of authors contributing multiple publications suggests the emergence of an intellectual nucleus or *core cluster* driving theoretical and pedagogical advancements. Chisolm's series of studies on *Visual Thinking Strategies (VTS)* demonstrates the application of visual literacy beyond arts education, showing its relevance to observation, empathy, and clinical reasoning in medical contexts. Meanwhile, Offerdahl and Arneson's work on assessment design highlights how visual literacy can influence cognitive complexity in student evaluation.

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Figure 3.
Most Relevant Authors

This convergence of multiple disciplines implies that visual literacy has transcended its traditional boundaries and now serves as an integrative framework connecting visual cognition, pedagogy, and communication. Such interdisciplinarity may explain the increasing citation dispersion observed earlier—indicating both intellectual vitality and the need for stronger theoretical coherence across domains.

Affiliations Production Over Time

Figure 4 illustrates the trends in article production by various universities and institutions engaged in visual literacy research in higher education between 2019 and 2024. Several institutions show substantial growth in research output. The University of Nevada demonstrates notable progress, increasing from three articles in 2019 to approximately nine in 2024. A similar upward trend appears at the University of California San Diego, which grew from zero publications in 2019 to around eight by 2024. The University of California also reported steady growth, rising from four articles in 2019 to eight in 2024. Texas Tech University experienced the most substantial increase among U.S. institutions, moving from one publication in 2019 to about ten in 2024.

Meanwhile, Universitas Pendidikan Indonesia (UPI) shows one of the most significant surges in Southeast Asia—rising from zero publications in 2019–2020, to one in 2021–2022, and sharply increasing to four in 2023 and nine in 2024. By 2024, UPI became the most productive Indonesian institution with twelve publications related to visual literacy.

Beyond reporting growth patterns, these institutional trajectories reveal important implications for the higher education landscape. First, the strong upward production in U.S. universities suggests sustained strategic investment in multimodal pedagogy, digital learning innovation, and interdisciplinary research—areas closely linked to visual literacy development. Institutions such as Texas Tech University and the University of California have historically leveraged robust funding ecosystems and cross-departmental collaborations, enabling visual literacy research to intersect with communication studies, digital media, STEM education, and cognitive sciences. Their growth reflects a broader institutional shift toward preparing students for visually saturated professional environments.

In contrast, the rapid rise of Southeast Asian universities—particularly UPI—signals increasing regional recognition of visual literacy as a critical competency for digital-era teaching and learning. This growth may be driven by national policies emphasizing digital transformation, curriculum modernization, and the upskilling of educators in multimodal communication. However, the concentration of output within a few institutions also highlights disparities in research capacity across the region, suggesting the need for

collaborative research networks, shared training infrastructures, and joint publication initiatives to strengthen global participation.

Overall, the sustained growth across these institutions indicates not only expanding academic interest but also shifting priorities within higher education systems. Visual literacy is increasingly positioned as an essential component of 21st-century learning strategies, prompting institutions to invest in research clusters, cross-disciplinary projects, and international partnerships that support multimodal competence development. As universities continue to digitalize teaching and assessment practices, the rising institutional engagement reflected in publication output suggests that visual literacy will play a central role in shaping future pedagogical and policy directions.

Figure 4.
Affiliations Production Over Time

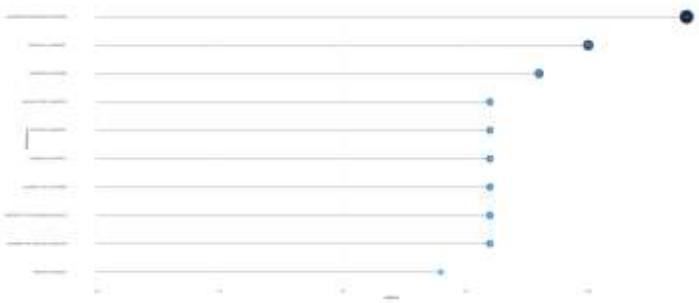

Figure 5.
Most Relevant Affiliations

Corresponding Author Countries

The United States (USA) dominates in the number of corresponding-author articles, with 155 publications, accounting for 19.5% of total outputs. Indonesia ranks second with 47 (5.9%), followed by Spain with 44 (5.5%), the United Kingdom with 42 (5.3%), and China with 34 (4.3%).

Regarding collaboration type, most publications are Single Country Publications (SCP), with the USA leading (143 SCPs), followed by Indonesia (38), Spain (39), and the UK (34).

In contrast, China recorded the highest number of Multiple Country Publications (MCPs)—nine articles representing 26.5% of its total output—indicating a strong international collaboration ratio. Indonesia also demonstrated robust cross-border engagement with nine MCPs (19.1%). Malaysia ranked second in

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collaboration proportion with four MCPs (28.6%). Conversely, Canada had no MCPs, indicating entirely domestic research activity.

Overall, the data show that while developed nations such as the USA, Spain, and the UK dominate research volume, developing countries—particularly China, Indonesia, and Malaysia—excel in international collaboration, highlighting the globalization of visual literacy research in academia.

The dominance of the United States in publication volume reflects its well-established academic infrastructure, long-standing integration of visual literacy in digital and media education, and extensive funding for interdisciplinary research. However, the relatively high *Multiple Country Publication (MCP)* ratios of China, Indonesia, and Malaysia suggest a strategic shift in the global research landscape, where emerging economies are increasingly building international partnerships to enhance visibility and access to global knowledge networks. These cross-border collaborations not only compensate for limited domestic research resources but also accelerate the exchange of pedagogical innovations and methodological approaches in visual literacy education.

The data imply that visual literacy is transitioning from a Western-centric discourse toward a more globally distributed field. The increasing engagement of Southeast Asian countries demonstrates the diffusion of visual literacy as a key educational competency within non-Western contexts, aligning with broader trends in digital transformation and higher education internationalization. For policymakers and academic leaders, these findings highlight the importance of supporting international co-authorship programs, joint doctoral initiatives, and open-access publishing to strengthen equitable participation in global scholarship. Ultimately, the collaboration patterns observed indicate that the future development of visual literacy research will depend not only on national productivity but also on the depth and sustainability of global academic partnerships.

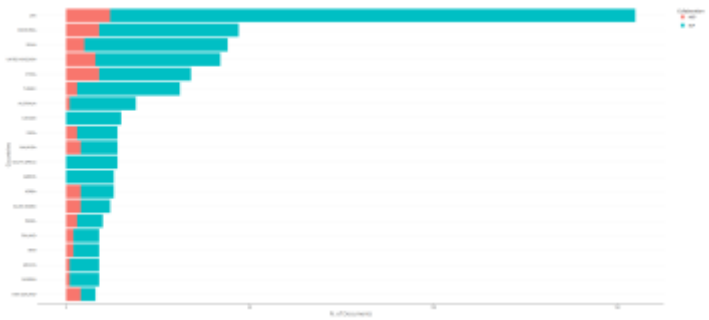

Figure 6.
Corresponding Author Countries

Table 1.
Corresponding Author Countries

Country	Articles	Articles %	SCP	MCP	MCP %
USA	155	19,5	143	12	7,7
INDONESIA	47	5,9	38	9	19,1

SPAIN	44	5,5	39	5	11,4
UNITED KINGDOM	42	5,3	34	8	19
CHINA	34	4,3	25	9	26,5
TURKEY	31	3,9	28	3	9,7
AUSTRALIA	19	2,4	18	1	5,3
CANADA	15	1,9	15	0	0
INDIA	14	1,8	11	3	21,4
MALAYSIA	14	1,8	10	4	28,6

Country Scientific Production

Figure 7 illustrates the total scientific production per country. The United States leads with 467 documents, followed by Indonesia (120), Spain (103), the United Kingdom (101), and China (83). Subsequent contributors include Turkey (63), Australia (45), Malaysia (44), Canada (34), and India (29).

Regionally, the USA dominates North America; Spain and the UK lead in Europe; while in Asia, Indonesia and China emerge as top contributors, followed by Malaysia and India.

These results indicate the strong dominance of Western countries, especially the USA, in visual literacy research, while developing nations like Indonesia, China, Turkey, and Malaysia demonstrate growing research capacity and engagement. This reflects the expanding globalization and diversification of scholarly activity in the field.

Figure 7.
Country Scientific Production

Table 2.
Country Scientific Production

Country	Frequency
USA	467
INDONESIA	120
SPAIN	103
UK	101
CHINA	83
TURKEY	63
AUSTRALIA	45
MALAYSIA	44

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Word Cloud

The term *"visual literacy"* appeared most frequently (94 occurrences), confirming it as the dominant focus of the literature. Other highly relevant keywords include *"higher education"* (46), *"information literacy"* (29), *"infographics"* (24), and *"digital literacy"* (23), illustrating close relationships between visual literacy and other literacy types.

Pedagogical concepts such as *"pedagogy"* (20), *"education"* (18), *"teaching"* (16), *"learning"* (15), and *"active learning"* (14) also emerged frequently, highlighting an emphasis on instructional strategies and educational design. Terms like *"multimodality"* (18), *"visual communication"* (16), and *"media literacy"* (14) further underscore the integration of visual literacy within broader communication frameworks.

Figure 8.
Word Cloud

Collaboration World Map

The strongest research collaboration occurred between Indonesia and Malaysia, recorded seven times, reflecting a robust and frequent partnership. Other significant collaborations included those between the USA and China (6), and several with a frequency of four, such as Malaysia–Saudi Arabia, UK–China, UK–Jordan, USA–Turkey, and USA–UK.

Geographically, the USA appeared central in facilitating global research collaboration, partnering with both Western and Asian countries—including Indonesia, Malaysia, Korea, Hong Kong, and Middle Eastern nations such as Jordan, Turkey, and Israel.

Additionally, intra-Asian collaborations (e.g., Malaysia–China, China–Hong Kong, China–Singapore, Malaysia–Thailand) indicate a strengthening regional research network. European countries such as the UK and Spain also exhibited cross-continental partnerships (e.g., UK–Australia, Spain–Ecuador).

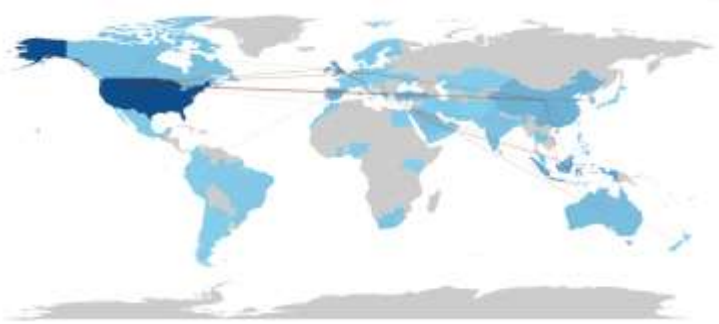

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Figure 9.
Collaboration World Map

Collaboration Network

The collaboration network visualization (Figure 10) reveals several dominant regional clusters across the global research landscape on visual literacy. In Southeast Asia, strong institutional linkages are observed between Universitas Pendidikan Indonesia (UPI) and Universiti Malaya, reflecting a growing trend of cross-border cooperation within ASEAN academic networks. Another Southeast Asian cluster connects Universitas Sebelas Maret, Universitas Negeri Semarang, and Western Sydney University, suggesting that collaborative ties are often fostered through regional research consortia and international postgraduate programs.

In North America, collaboration networks are denser and more established. Two major clusters are identified: one centered around the University of California and University of Georgia, and another surrounding UC San Diego, which actively collaborates with San Diego State University, Chapman University, Northwestern University, Ohio State University, Indiana University, and Texas Tech University. The strong interconnectedness of U.S. institutions can be attributed to established funding mechanisms (e.g., NSF and NEA grants), a long tradition of interdisciplinary research, and the global reach of American academic publishing systems.

European collaboration clusters are also visible, particularly among University of Crete, University of Thessaly, and Aristotle University of Thessaloniki (Greece), as well as between Linköping University and Stockholm University (Sweden). These networks tend to align with the European Union's Horizon research programs, which encourage regional academic mobility and multi-country project consortia. Additionally, the collaboration between Fiji National University and The University of the South Pacific illustrates a regional approach to research development in Oceania, driven by shared educational and infrastructural resources.

Although regional clustering appears robust, cross-continental collaboration remains limited. Southeast Asian and European clusters show relatively weak linkages with major North American hubs. Institutions from other high-output countries—such as China, Spain, Turkey, and India—are not positioned as central nodes within the global network, indicating dispersed or underdeveloped international partnerships. The limited representation from African and South American universities further highlights an imbalance in global research participation and capacity building.

A correlation analysis between institutional productivity and international collaboration suggests that highly productive institutions tend to exhibit broader collaboration networks. For instance, Texas Tech University and Universitas Pendidikan Indonesia (UPI)—both among the most prolific contributors—also demonstrate a higher number of multi-country publications. This pattern reinforces the premise that research productivity and collaboration intensity are mutually reinforcing: institutions with strong publication output are more likely to attract international partners, while collaborative networks, in turn, amplify research visibility and impact. Conversely, institutions with high local productivity but limited global engagement, such as several Indonesian and Chinese universities, may experience citation saturation within domestic networks, constraining international dissemination.

Sociocultural and policy-related factors further explain this disparity. In Indonesia, the government's *Merdeka Belajar–Kampus Merdeka* initiative and emphasis on Scopus-indexed publications have accelerated domestic productivity but not yet fully expanded global partnerships. In contrast, the United

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States and Western European countries benefit from established academic infrastructures, English-language dominance in scholarly communication, and long-standing participation in transnational research funding schemes. These structural advantages collectively reinforce the visibility and influence of Western institutions in global bibliometric networks.

In summary, while the collaboration network demonstrates growing regional engagement, particularly in Southeast Asia, it still reflects a global asymmetry in research connectivity. Strengthening interregional and cross-continental collaborations—especially between emerging research economies and established academic centers—will be crucial for fostering a more balanced and inclusive global research ecosystem in visual literacy.

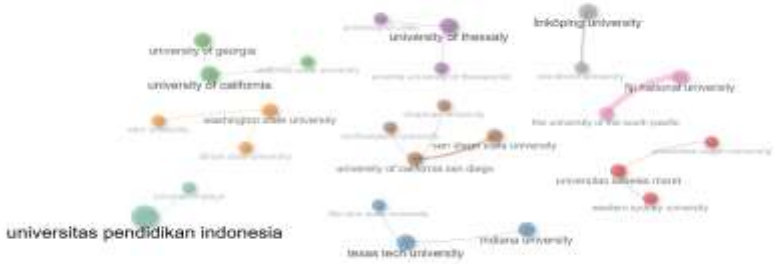

Figure 10.
Collaboration Network

Conslusion

This bibliometric study offers a significant theoretical contribution by situating visual literacy within a broader global knowledge ecosystem, demonstrating how the field has transitioned from scattered pedagogical practices into a structured and interconnected research domain. Rather than merely identifying increases in publication output, the study provides a comprehensive mapping of how visual literacy scholarship has expanded across regions, disciplines, and institutional networks. This global perspective highlights the shifting centers of knowledge production, illustrating that visual literacy is no longer dominated solely by Western institutions but increasingly shaped by emerging academic regions such as Southeast Asia.

Theoretically, the study advances the understanding of visual literacy by revealing its evolution into a multidimensional construct that intersects with digital literacy, information literacy, media education, and multimodal communication. These findings underscore that visual literacy operates not only as a cognitive or interpretive skill but as an integrative framework that supports meaning-making, identity formation, and communication in digitally mediated academic environments. By mapping these thematic convergences, the study establishes a conceptual foundation for reframing visual literacy as a global, interdisciplinary literacy—one that expands beyond classroom-based practices and aligns with the broader transformation of higher education in the digital age.

From an empirical standpoint, the co-authorship and country-collaboration patterns highlight two critical insights. First, institutions with higher multi-country publication ratios—particularly in China (26.5%) and Indonesia (19.1%)—tend to exhibit stronger visibility and network centrality, suggesting that international collaboration is a key determinant of research impact. Second, the fragmentation of citation patterns after

2020 implies that the field is in a diversification phase, opening opportunities for future synthesis and model-building.

Based on these findings, this study proposes several data-driven recommendations. For researchers, future studies should pursue cross-regional bibliometric comparisons and thematic evolution analyses using combined datasets (e.g., Scopus–WoS) to refine the global research map.For higher education institutions, fostering research clusters that integrate visual, digital, and media literacy can enhance interdisciplinary innovation and international visibility. For policymakers, evidence from this study underscores the need for targeted funding schemes that support collaborative research networks between Western and Southeast Asian universities, which have demonstrated high potential for growth but limited resource parity.

In summary, the novelty of this study lies in quantitatively establishing the global dynamics of visual literacy scholarship and empirically validating its transition into a cross-disciplinary, collaborative, and increasingly globalized research domain. These insights offer a foundation for advancing theoretical frameworks, designing evidence-based curriculum models, and promoting equitable participation in global visual literacy discourse.

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