
Application State And Trend Of Artificial Intelligence Generated Content In Design And Art

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This study provides a comprehensive bibliometric review of Artificial Intelligence Generated Content (AIGC) applications in design and art, analysing publication trends from 2022 to 2024. Using data from the SCOPUS database, the study examines 472 publications, identifying key themes such as generative models, large language processing, and educational applications. The findings reveal a sharp increase in research interest, with prominent contributions from the United States and China. Major journals in this field include Documentation, Information & Knowledge and Computers and Education: Artificial Intelligence. This review highlights current research trajectories and underscores the need for ethical guidelines and improved models to ensure responsible integration of AIGC in creative industries. The insights gained here aim to inform future research directions, contributing to the sustainable and innovative application of AIGC in design and art.

Keywords: Artificial Intelligence Generated Content (AIGC), Design or Art, Bibliometric Analysis.

1. Introduction

Artificial Intelligence Generated Content (AIGC) refers to the automatic generation of various forms of content using artificial intelligence technology. These forms include text, voice, code, images, video, and robotic actions (Fan & Jiang, 2024). Unlike traditional human content creation, AIGC relies on computer algorithms, particularly deep learning and natural language processing technologies, to analyse and learn from vast amounts of data, enabling the automated generation of content (Yu, Yang, & Li, 2024). AIGC is considered a new form of content creation following professional-generated content (PGC) and user-generated content (UGC). It can fully leverage technological advantages in areas such as creativity, expressiveness, iteration, dissemination, and personalization (Fan & Jiang, 2024; Yu et al., 2024).

Artificial Intelligence Generated Content (AIGC) is the automatic production of a variety of content using artificial intelligence technology. Among these formats are robotic actions, images, video, code, voice, and text (Fan & Jiang, 2024). Unlike conventional human content creation, AIGC utilises computer algorithms, particularly deep learning and natural language processing technologies, to analyse and learn from immense quantities of data, thereby facilitating the automated generation of content (Yu, Yang, & Li, 2024). AIGC, as a novel form of content creation, is considered to be a successor to user-generated content (UGC) and professional-generated content (PGC). It is capable of entirely capitalising on technological advantages in areas such as personalisation, dissemination, iteration, expressiveness, and creativity (Fan & Jiang, 2024; Yu et al., 2024). The journals are illustrated in Table 2.

AIGC demonstrates broad application prospects across various industries (Wu, Gan, Chen, Wan, & Lin, 2023). AIGC shows tremendous potential in the fields of finance, education, media and entertainment, healthcare, law, e-commerce, and gaming (Wu et al., 2023). Especially in the fields of design and art (C. Zhang & Lu, 2021). AIGC has shown considerable potential, transforming conventional creative processes (Lou, 2023). By utilizing generative adversarial networks (GANs), deep neural networks, and large language models, AIGC has broadened the scope of what can be achieved in creative domains (Xu, 2024). For example, image generation models such as DALL-E and Midjourney allow designers and artists to create intricate and visually striking artworks, while natural language models like GPT-4 facilitate the generation of textual descriptions, concepts, and narratives for projects (Brisco, Hay, & Dhimi, 2023). These tools are progressively incorporated into design workflows, where they not only accelerate ideation and prototyping but also enable distinctive and varied forms of expression that were formerly difficult to attain through human effort alone. The incorporation of AIGC into design methodologies signifies a notable transformation, connecting human creativity with machine efficiency (S. Chen, 2024).

Bibliometrics is a field that examines literature in certain study domains to uncover prevailing patterns and provide guidance for future (Feng et al., 2023; Li et al., 2020). Tools like CiteSpace and VOSviewer are frequently employed in bibliometric analysis to collect relevant data from databases such as Web of Science or SCOPUS in order to clarify the global scientific research dynamics on a specific topic (Kemeç & Altınay, 2023). By a thorough analysis of several variables, including publication quantity, citation metrics, publication years, authorship, and research institutions, researchers may identify critical concerns and developmental pathways within the subject (Bataglin & Kruglianskas, 2022; Kumar, Kamble, & Roy, 2020)

The creation of bibliometric reports is streamlined by the efficient citation management features available in widely used literature databases, such as Web of Science, SCOPUS, and Google Scholar (Gusenbauer, 2024). This study endeavours to gain a comprehensive understanding of the current research status of AIGC in the fields of design and art by utilising bibliometric methods to analyse the pertinent literature in the SCOPUS database from 2022 to October 2024. Additionally, it will investigate the application trend of AIGC in these fields (Donthu, Kumar, Mukherjee, Pandey, & Lim, 2021).

2. Methodology

A bibliometric analysis was conducted to evaluate publication trends and gain insights into research status of AIGC in design and art (Donthu et al., 2021). On October 26, 2024, a search was conducted in the SCOPUS database using the following keyword chain: (TITLE-ABS-KEY (aigc OR “AI-generated content” OR “artificial intelligence generated content” OR “content created by AI” OR “generative AI”) AND TITLE-ABS-KEY (design OR art)) AND (LIMIT-TO (SUBJAREA, “SOC”) OR LIMIT-TO (SUBJAREA, “ARTS”)) AND (LIMIT-TO (DOCTYPE, “cp”) OR LIMIT-TO (DOCTYPE, “ar”) OR LIMIT-TO (DOCTYPE, “re”)). This search yielded 472 relevant documents, collectively amassing 21,209 citations, with an average of 4.53 citations per document. Table 1 illustrates the distribution and volume of publications centred on the application of AIGC in design and art.

The Bibliometrix package (<http://www.bibliometrix.org/>), an R-based tool for scientific mapping, was then applied to analyse the set of 472 documents (Kumar et al., 2020). As detailed in Table 1, this collection includes 359 journal articles, 9 review papers, and 104 conference papers. To provide a thorough understanding of the current status and trends of AIGC in the fields of design and art, these documents were subjected to an extensive quantitative analysis.

Table 1 Summary of the Main Information of Collected Bibliometric Data

Description	Results
Timespan	2022—2024
Sources (Journals, Books, etc)	252
Documents	472
Annual Growth Rate %	25.99
Average citations per doc	4.53
References	21209
Keywords Plus (ID)	1486
Author's Keywords (DE)	1542
Authors	1350
Authors of single-authored docs	96
International co-authorships %	18.86
article	359
conference paper	104
review	9

3. Quantitative Analysis

a. Analysis of Publication Years

Figure 1 shows the annual number of scientific publications from 2022 to 2024. As shown in the figure, few articles have been published before 2022. However, a significant surge occurred in 2022 and 2024, with the amount of publications doubling compared to the previous years. The peak was reached in 2024, with 361 publications. Research in this field continues to garner substantial attention.

Figure 1 Annual scientific production of using AIGC in design and art from 2022 to 2024.

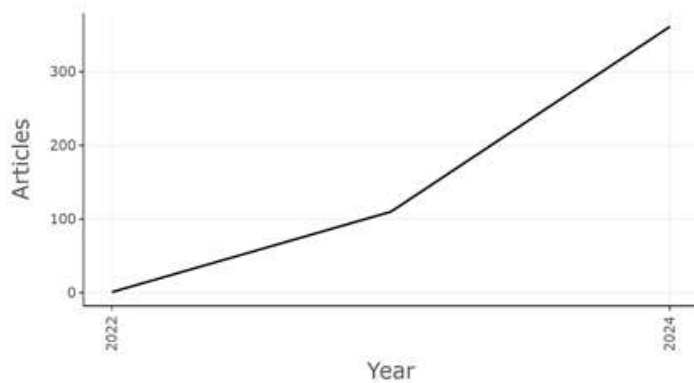


Figure 2 presents the annual average citation count of articles published between 2022 and 2024. Articles from 2023 exhibited the highest average citation rate, with 6.26 citations per article, indicating a peak in citation trends. In comparison, the 110 publications from 2024 had a lower average citation count of 2.11.

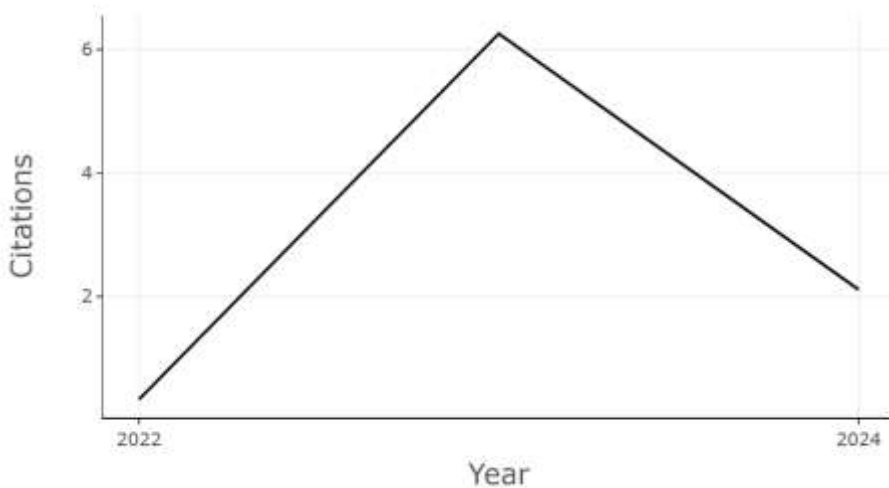


Figure 2 Average article citations per year of using AIGC in design and art from 2022 to 2024.

b. Analysis of Sources

Table 2 presents the key publication sources related to the application of AIGC technology in design and art. Each source has contributed one or more documents within the scope of this analysis. Leading the field is the journal *Documentation, Information & Knowledge*, with approximately 13 publications from 2022 to 2024 focused on AIGC in design and art. *Computers and Education: Artificial Intelligence* and the *IEEE Global Engineering Education Conference (EDUCON)* follow closely, each contributing 12 publications. *Archives of Design Research* has published around nine relevant papers, while other journals included in this analysis have fewer than nine publications. For researchers focusing on the application of AIGC in design and art, these top five journals represent primary outlets for disseminating their work, as shown in Table 2.

Table 2 Top 10 most relevant journals on the use of AIGC in design and art.

Sources	Articles
<i>Documentation, Information & Knowledge</i>	13
<i>Computers and Education: Artificial Intelligence</i>	12
<i>IEEE Global Engineering Education Conference (EDUCON)</i>	12
<i>SIGCSE 2024: Proceedings of the 55th ACM Technical Symposium on Computer Science Education</i>	10
<i>Archives of Design Research</i>	9
<i>AI & Society</i>	7
<i>Education and Information Technologies</i>	7
<i>International Journal of Human–Computer Interaction</i>	7
<i>Sustainability (Switzerland)</i>	7
<i>12th International Conference on Learning Representations, ICLR 2024</i>	6

c. Analysis of Authors

Figure 3 shows a ranked list of authors, with the frequency of their contributions represented by the size and number within each bubble. Zhang Y emerges as the most prolific author, with nine publications, indicating their significant influence and contribution to this research area.

Following closely, Zhang X has contributed eight publications, while Chen X and Kim J each have seven, suggesting that these authors also play prominent roles in advancing AIGC research within design and art. Other authors, including Li Z, Liu X, Ma X, Wang C, Wang Y, and Zhao Y, each contributed five publications.

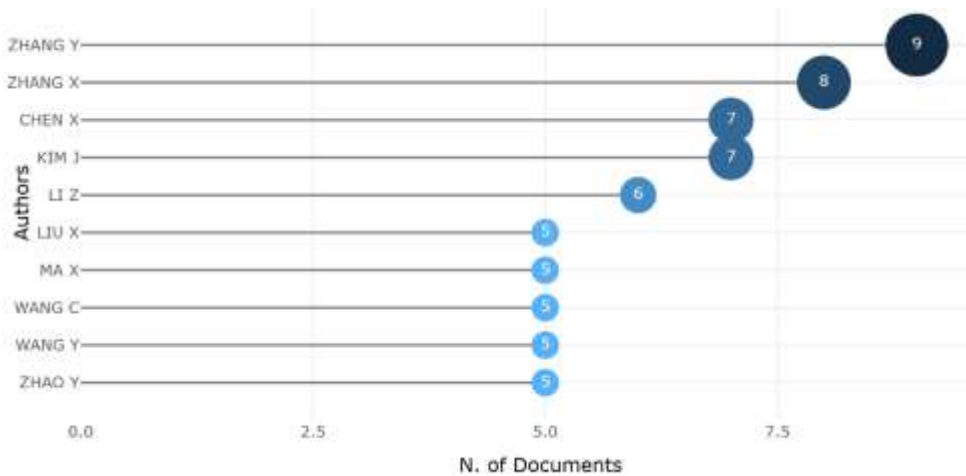


Figure 3 Top 10 most relevant authors on the use of AIGC in design and art.

d. Analysis of Topic

Figure 4 is a thematic map which provides an analytical overview of key themes in the literature on AIGC within the fields of design and art (Casadei et al., 2023). This figure is separated into four quadrants based on two dimensions: the relevance degree (centrality) on the horizontal axis and the development degree (density) on the vertical axis. This distribution highlights the maturity and importance of different topics within the AIGC domain.

Each bubble indicates a keyword network cluster, with the cluster names identifying the most frequently terms (Curiskis, Drake, Osborn, & Kennedy, 2020). Therefore, terms such as “generative ai,” “state of the art,” “large language model,” “art computing,” “creatives,” and “diffusion model” are the most relevant thematic indicators. These themes are distributed across different areas of the map, showing their centrality and density, which indicates their importance and level of development within this research domain.

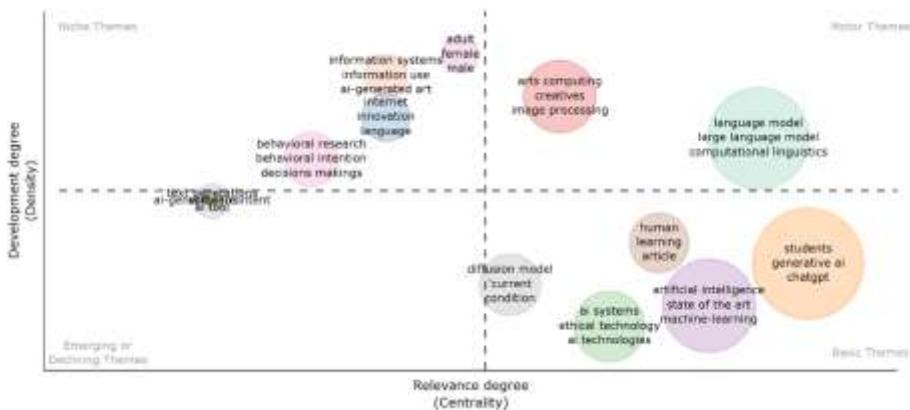


Figure 4 Thematic map of keyword network clusters in design and art

e. Analysis of Keywords

Three-field plots are generated to provide an overview of the keywords associated with the implementation of AIGC in design and art (Sahoo, 2022). Illustrated in Figure 5, these diagrams focus on the most prominent keywords, with authors represented in the left field, keywords in the middle field, and publication sources in the right field. This visualization highlights the relationships among top keywords, leading authors, and major journals. As shown in Figure 5, authors such as Wang C, Kim J, Zhao Y, Liu X, Chen X, Li Z, Zhang Y, Zhang X, Wang Y, and Ma X have employed nearly all prominent keywords in their publications.

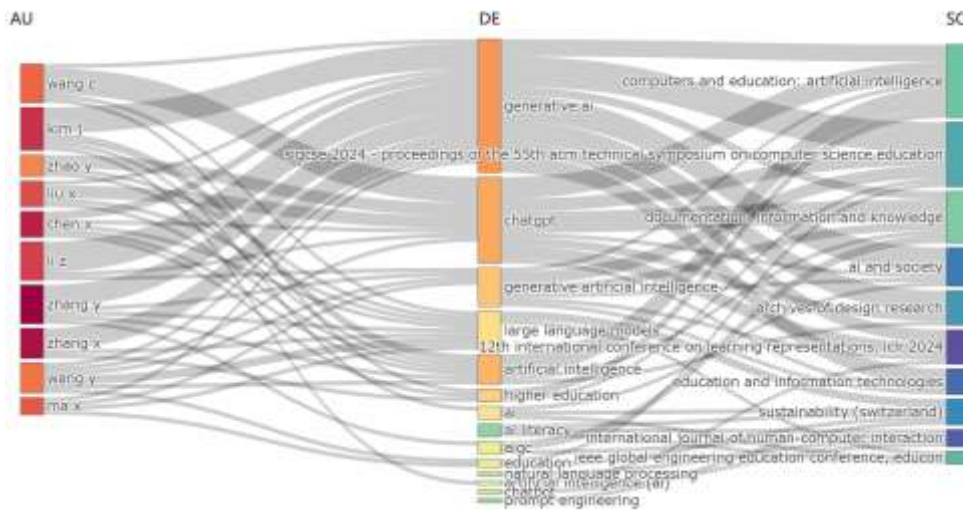


Figure 5 Three-fields plot for the relationship among top authors (the left field), top keywords (the middle field) and top journals (the right field) in AIGC used in design and art publications.

The most frequently used keywords in the field include “generative AI,” “ChatGPT,” “generative artificial intelligence,” “large language models,” “artificial intelligence,” “higher education,” “AI literacy,” “AIGC,” and “education.” These keywords appear most commonly in journal articles on AIGC applications in design and art. Leading publication sources in this area include Documentation, Information & Knowledge, Computers and Education: Artificial Intelligence, IEEE Global Engineering Education Conference (EDUCON), and Archives of Design Research, which represent prominent journals contributing to the discourse on AIGC in creative fields.

Figure 6 illustrates the relationships between a variety of keywords in the examination of the application of AIGC in art and design. The central point of the figure represents the overall centre of the research field, while the two dimensions represent the average position of each keyword (J. Zhang, Bakhir, Han, & Xu, 2024).

Red cluster (right side): This cluster includes keywords related to “teaching,” “higher education,” “engineering education,” and “learning systems,” highlighting the current

applications of AIGC in the educational field. Other relevant keywords include “generative artificial intelligence,” “teachers,” and “curriculum design,” reflecting the innovative use of AIGC in educational contexts, particularly in curriculum design, teaching tools, and enhancing student learning experiences.

Blue cluster (left side): This cluster encompasses keywords such as “natural language processing systems,” “large language model,” and “computational linguistics,” indicating the technical application direction of AIGC, especially in language models and computational linguistics. The development in this field provides technical support for design and art through language generation and text processing, fostering new modes of art creation based on language generation.

Additionally, an isolated keyword, “state of the art” (in green), appears slightly higher than other themes on Dimension 1, potentially indicating that it represents the most cutting-edge research findings or technologies in the entire field of AIGC application.

The different colour clusters in the figure help to reveal the distinct subfields within the study of application of AIGC in design and art of the keywords. This provides valuable insights for further research and exploration, showing how various themes align and influence each other within the broader domain.

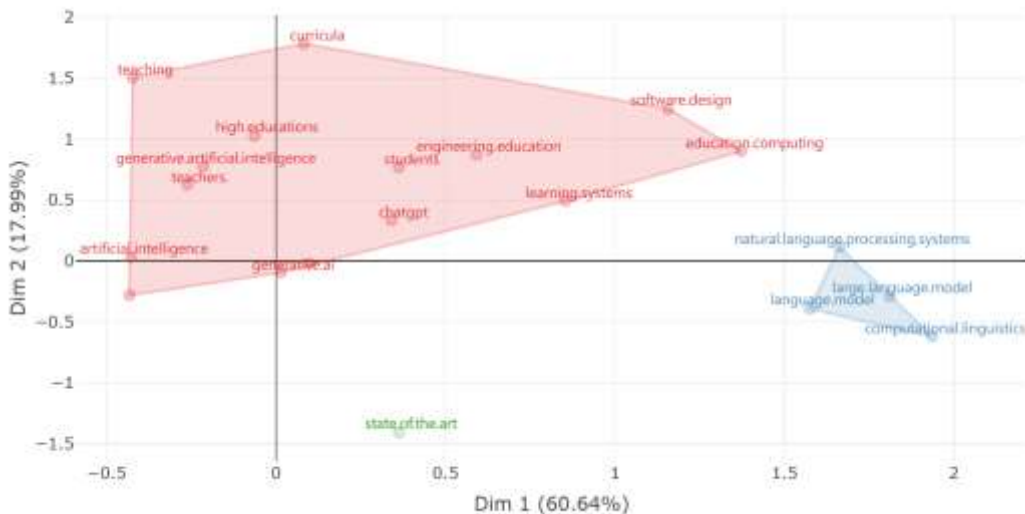


Figure 6 Conceptual structure map of keywords on the use of AIGC in design and art (Dim.1 and Dim.2: the average position of the articles included in each keyword).

Figure 7 shows the cumulative occurrences of key terms associated with AIGC in the context of design and art from 2022 to 2024. The chart reflects the growth of academic interest in AIGC-related topics, as evidenced by the increasing frequency of relevant keywords over time.

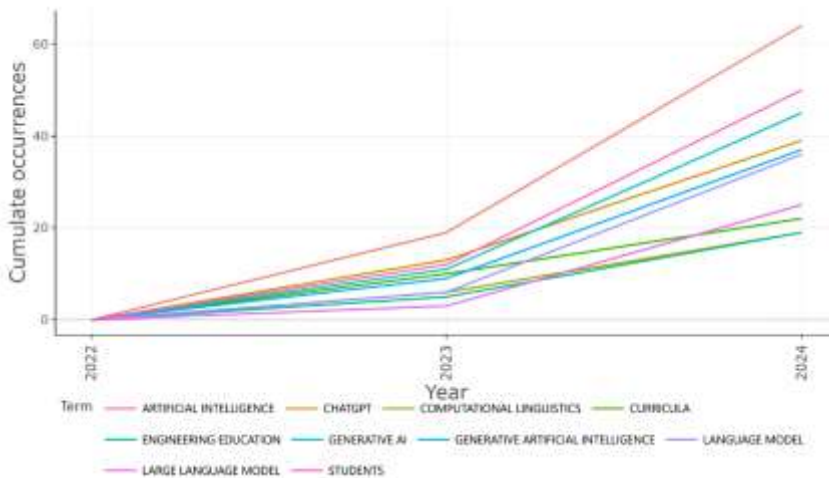


Figure 7 Annual occurrences of top keywords on the use of AIGC in design and art from 2022 to 2024.

Figure 8 is a tree map which illustrates the research themes and their prominence concerning the application of AIGC in design and art. The size of each block represents the frequency of topics in the literature, while different colours distinguish thematic areas (H. Chen, Feng, Li, Zhang, & Yang, 2019). Larger blocks, such as “artificial intelligence” (9%), “students” (7%), and “generative AI” (6%), indicate high research interest in these areas, reflecting a focus on AIGC in education, student applications, and generative AI. Additionally, “ChatGPT” (5%), “language model” (5%), and “generative artificial intelligence” (5%) occupy significant portions, showcasing the emphasis on large language models and generative AI technologies. Smaller blocks reveal secondary or emerging research areas, such as “deep learning” (2%), “teaching” (2%), and “AI systems” (1%), which may represent potential future research



directions. This structure enables us to identify the main hot topics in AIGC applications and their intersection with fields like education and computer science.

Figure 8 Themes of tree map on the use of AIGC in design and art.

Figure 9 is a Word Cloud analysis map which visually represents the most prominent terms associated with the application of AIGC in design and art (Heimerl, Lohmann, Lange, & Ertl, 2014). Each subfigure reflects different aspects of keywords used across publications, offering insights into the primary focus areas in this field.

In subfigure (a), “keywords plus” are extracted from article reference titles, highlighting terms that reflect the core topics of interest (Wei, Liu, & Lyu, 2024). Prominent terms include “artificial intelligence,” “generative AI,” and “large language model,” indicating a strong emphasis on AI-driven content creation technologies. Subfigure (b) illustrates “author’s keywords,” chosen directly by researchers to represent their article’s themes (Uddin & Khan, 2016). Terms such as “generative AI,” “ChatGPT,” and “artificial intelligence” are prevalent, revealing the significant role of generative models and conversational AI in current research. Subfigure (c) shows “title keywords,” derived from article titles, with “generative AI,” “education,” and “learning” standing out. This reflects a growing interest in educational applications of AIGC, especially in fostering learning and enhancing teaching methodologies. Lastly, subfigure (d) visualizes “abstract keywords,” where “generative AI,” “design,” and “students” are prominent. This suggests that researchers are increasingly exploring AIGC’s impact on student learning and design applications.

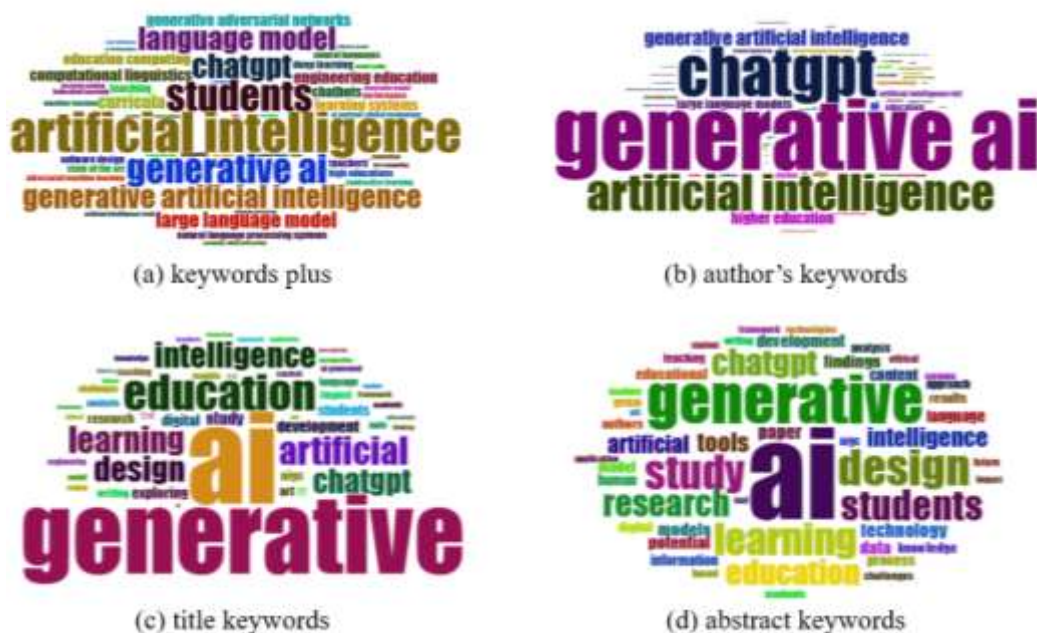


Figure 9 Word cloud of top keywords on the use of AIGC in design and art publications (font size: word occurrences).

4. Conclusion

The current state and trend of AIGC are comprehensively presented in this bibliometric analysis. AIGC in the fields of design and art. Through the examination of research publications from 2022 to 2024, we observe a significant rise in scholarly interest, marked by an increase in annual publications and a broadening scope of AIGC applications in creative industries. The United States and China lead in publication output, underscoring their roles as key contributors to advancing AIGC technology. Prominent journals like *Documentation*, *Information & Knowledge and Computers and Education: Artificial Intelligence* are identified as major platforms for disseminating research in this domain. Core themes within AIGC literature include generative models, large language models, and educational applications, which illustrate the versatility and expanding impact of AIGC in creative fields. This study not only highlights emerging research directions but also identifies key challenges and ethical considerations associated with AIGC adoption in creative practices. It is anticipated that these insights will support further exploration and responsible integration of AIGC in design and art, facilitating the ongoing evolution of AI-driven creativity.

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