



RESEARCH ARTICLE

Designing for All in Digital Contexts: A Thematic Review of Accessibility, Inclusive Principles, and Ethical Visual Communication in Graphic Design

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Abstract: This article uses a qualitative thematic review to examine how accessibility, inclusive design, and ethical visual communication relate to one another in digital graphic design. Web interfaces, mobile applications, social media images, data visualizations, public service interfaces, and AI-generated visual content are now common forms of digital communication. In this context, graphic design is not only the production of visual style or brand identity. It also affects whether users can perceive information, understand it, act on it, and participate in digital information environments.

The article conducts a thematic synthesis of 46 core analytical studies through systematic literature search, screening, data extraction, coding, and thematic synthesis. It also draws on 11 methodological and contextual references to support the research method and conceptual background. The analysis identifies three main themes. First, accessibility should be understood as accessible visual form, including typography, colour contrast, layout hierarchy, icon clarity, alternative text, multimodal cues, and interactional accessibility. Second, inclusive design should not be treated as a late-stage correction. It should be built into the early design process through user diversity, co-design, iterative testing, and contextual responsiveness. Third, ethical visual communication places accessibility and inclusion within the responsibilities of visual communication, requiring digital graphic design to address representation, visual bias, and deceptive visual strategies.

Keywords: digital graphic design; accessibility; inclusive design; ethical visual communication; AI-generated visual content

1. Introduction

In contemporary digital media environments, graphic design has moved beyond print based visual production and now operates across web interfaces, mobile applications, social media, digital branding, public service systems, data visualization, interactive platforms, and AI-generated visual content. This shift has changed the social function of graphic design. It no longer only arranges images, type, colour, layout, and symbols. It also affects whether users can perceive information, understand it, navigate interfaces, and participate in digital life. Recent work on inclusive graphic design shows that accessibility has moved from a peripheral technical concern to a central issue in visual communication, especially as design practice must address user diversity, full participation, and social inclusion (Barriga-Fray & Samaniego, 2026).

Yet wider digital circulation does not guarantee equal access. Digital graphic design can improve communication speed and visual appeal, but it can also create new forms of exclusion. Low contrast text, dense layouts, colour dependent information, missing alternative text, uncontrolled motion, decorative interfaces, and inconsistent navigation can limit access for users with visual

impairment, colour vision deficiency, cognitive diversity, neurodiversity, motor impairment, age related limitations, or low digital literacy. Studies of older adults show that visual design and accessibility settings shape technology adoption and mobile usability, which means that visual form is not a neutral aesthetic layer but a condition of digital participation (Ávila-Muñoz et al., 2026). Research on users with visual impairments reaches a similar conclusion: accessibility, usability, and responsible technology development must be considered together. Platforms that prioritize functional deployment while neglecting accessible interaction cannot produce genuinely inclusive digital systems (Adnan et al., 2025).

In graphic design and visual communication, accessibility involves typography, colour contrast, layout hierarchy, icon clarity, image description, screen-reader compatibility, multimodal cues, visual simplification, and cognitive load. Research shows that the graphic design and visual communication industries increasingly need web accessibility skills, although this need is still uneven across education, job requirements, and professional practice (Massaguer & Alcaraz-Martínez, 2024). Accessibility should therefore not be treated as a task reserved for front-end development, software engineering, or HCI. It should be part of graphic design competence. Designers need to judge not only whether a visual form is aesthetically effective, but also whether different users can perceive, understand, and use it. Research on accessible typography and colour design further shows that font, font size, line spacing, contrast, and mobile interaction influence the digital citizenship skills of older users, which strengthens the case for accessibility literacy in design education (Tangcharoenrungrueang et al., 2025).

Inclusive design expands this discussion by shifting attention from post-design compliance to early recognition of human diversity. Participatory design, co-design, user testing, and community feedback allow different users' experiences to enter design decision-making. A review of participatory and inclusive design for autistic children shows that universal design, adaptable design models, and user participation help build more inclusive digital environments, especially when standardized questionnaires cannot fully capture user needs (Ferreira & Chaves de Castro, 2024). This is directly relevant to digital graphic design. Many forms of visual exclusion arise because design processes assume an abstract average user who is fully able, digitally literate, and culturally neutral. Inclusive design questions this assumption and asks designers to respond from the start to differences in bodily ability, perception, cognitive rhythm, language, culture, and technological access.

Digital graphic design also belongs to the field of ethical visual communication. Visual communication shapes attention, emotion, interpretation, and action through image choice, symbolic structure, colour, layout hierarchy, and interaction pathways. When accessibility and inclusion are ignored, the problem is not only poor usability. It is also an ethical failure. Complex visual hierarchy may prevent users from finding key information. Dark patterns may guide decisions through button colour, default settings, pop-up placement, or visual emphasis. Image representation may reproduce stereotypes related to disability, gender, age, race, or culture. AI-generated imagery may also repeat visual biases from training data. Research on AI-driven graphic design shows that AI is changing design interpretation, layout generation, typography generation, colour palette recommendation, and visual content production, while raising problems of interpretability, human control, dataset diversity, and visual clarity (Zou et al., 2025). As AI enters design workflows, accessibility and visual ethics become harder to separate.

This issue is also visible in debates on visual research and AI-generated images. Milasan (2024) notes that AI-generated images are already affecting visual methods and visual research, while raising concerns about authenticity, representation, contextual interpretation, and ethical use. For graphic design, AI-assisted production should not be treated only as a way to improve efficiency or expand visual options. It also requires ethical review. In social media campaigns, public communication, health communication, and educational interfaces, AI-generated visual content may mislead users or exclude certain groups if designers do not disclose its use, correct context, or assess representational diversity. Ethical responsibility in digital graphic design therefore lies in content selection, technological tools, platform mechanisms, and visual form.

To clarify the scope of this review, digital graphic design is understood here not only as a professional label, but as a visual communication practice operating through typography, colour, layout, image selection, interface hierarchy, data visualization, branding systems, social media visuals, public service interfaces, and AI-generated imagery. Therefore, studies were included when they addressed these visual and communicative dimensions, even if they were published in adjacent fields such as HCI, accessibility studies, interface design, AI ethics, or digital inclusion.

Existing studies have examined accessibility, inclusive design, AI-generated imagery, interface ethics, and digital inclusion, but three gaps remain. First, conceptually, accessibility is often treated as a technical or compliance issue, while inclusive design and ethical visual communication are discussed in separate literatures. This makes it difficult to explain how visual form, user diversity, and design responsibility interact in digital graphic design. Second, methodologically, existing reviews often focus on specific domains such as web accessibility, HCI, AI ethics, or inclusive education, but few synthesize how these fields inform graphic design and visual communication. Third, disciplinarily, many relevant studies discuss interface structure, data visualization, public communication, or AI-generated imagery without explicitly linking these findings back to graphic design practice. As a result, current literature cannot fully explain how digital graphic design can move from aesthetic-centred visual production toward accessible, inclusive, and ethically responsible visual communication. This review addresses this gap by proposing a three-dimensional framework: accessible visual form, inclusive design process, and ethical visual communication.

Graphic design education and professional formation are central to this problem. Research on graphic design and social sustainability argues that design education should respond more directly to inclusion, equity, human rights, and social cohesion. Otherwise, future designers may continue to understand graphic design mainly as formal style or market communication, rather than as a practice tied to public responsibility (Bucio-Gutierrez et al., 2025). If accessibility remains an additional skill or a final testing item, designers will struggle to connect concept development, visual strategy, user research, and communication ethics. If accessibility becomes part of the knowledge structure of graphic design, it can link aesthetics, usability, inclusion, and ethics.

This article therefore understands accessibility in digital graphic design as a principle of visual communication rather than a narrow matter of technical compliance. Accessibility concerns whether visual content is perceptible, readable, understandable, and navigable. Inclusive design adds that design should not be organized around a single standard user, but should anticipate difference through user diversity, co-design, and participatory evaluation. Ethical visual communication asks who can access information, who is excluded by visual systems, who is stereotypically represented, and which visual strategies may undermine user autonomy. Accessibility, inclusion, and ethics are thus mutually connected dimensions of digital graphic design.

This article adopts a qualitative thematic review to synthesize literature from the past five years. Thematic review is suitable because the aim is not to count studies or compare effect sizes, but to identify recurring conceptual relations across graphic design, visual communication, HCI, UX design, design education, digital inclusion, and AI-mediated visual production. The review focuses on accessibility, inclusive principles, and ethical visual communication, and asks how this literature understands "designing for all" in digital graphic design.

The aim is to construct a three-dimensional explanatory framework for digital graphic design: accessible visual form, inclusive design process, and ethical visual communication. The framework argues that inclusivity should not depend only on accessibility testing after design completion, nor remain an abstract social value. It should appear in visual form, design process, and communication ethics. Designing for all does not mean lowering aesthetic standards or limiting design innovation. It means reconsidering aesthetic quality, communicative clarity, and social responsibility in relation to user difference.

Based on this background, this article proposes three research questions:

RQ1: How has accessibility been conceptualized and operationalized in digital graphic design literature?

RQ2: What inclusive design principles are emphasized in digital visual communication and graphic design studies?

RQ3: What ethical concerns emerge in the relationship between accessibility, inclusion, and visual communication in digital contexts?

The article makes three contributions. First, it repositions accessibility from technical compliance and assistive functionality to a foundational principle of digital visual communication. Typography, colour contrast, layout hierarchy, image description, and multimodal cues are treated as socially and ethically meaningful visual forms. Second, it connects inclusive design with graphic design, arguing that designing for all requires participatory and anticipatory decision-making rather than remedial functions for a small group of users. Third, it brings ethical visual communication into accessibility research by linking fairness, understandability, representation, and resistance to manipulation with design evaluation. This integration supports a shift from aesthetic-centred visual production toward accessible, inclusive, and ethically responsible visual communication.

2. Conceptual Background

2.1 Accessibility in Digital Graphic Design

In the context of digital graphic design, accessibility should first be understood as a fundamental condition that determines whether visual information can be perceived, read, understood, and operated by diverse users, rather than merely as a technical requirement associated with web standards, assistive technology, or software compliance. For graphic design and visual communication, accessibility involves visual and interactive elements such as typography, colour contrast, layout hierarchy, icon systems, image-text relationships, visual navigation, and multimodal presentation. A recent review of digital accessibility and artificial intelligence points out that the core goal of digital accessibility is to enable users with visual, auditory, motor, or cognitive impairments to access, perceive, and interact with digital systems. In this sense, accessibility is a precondition for digital participation rather than an additional technical correction (Chemnad & Othman, 2024).

At the level of graphic design, accessibility is mainly reflected in perceptibility, readability, and structural understandability. Research on Visual Communication Design Accessibility (VCDA) for users with low vision shows that text size, font weight, background colour, emphasis methods, input field position, and information hierarchy in public data interfaces all affect the speed and stability with which users identify information (Lim et al., 2023). Studies on typography and legibility also indicate that typefaces, colour, media format, and display conditions influence how visual information is absorbed and processed. Therefore, digital graphic design should not only consider whether content has been published online, but also whether that content is presented in a readable, distinguishable, and low-cognitive-load form (Možina & Brozović, 2025).

Colour accessibility is also an important component of accessibility. Research on colour schemes for web resources shows that users with different types of colour vision deficiency differ in their recognition of colour schemes. Therefore, design decisions cannot rely solely on conventional visual experience, nor can they take users with "normal" colour vision as the only standard (Sajek et al., 2025). At the same time, accessibility analyses of educational websites show that problems such as heading structure, navigation order, alternative text, form labels, and contrast errors affect users' access to and understanding of digital content (Singh et al., 2024). This demonstrates that accessibility involves not only individual visual elements, but also the overall information architecture and interaction logic.

In addition, accessibility should be understood as a continuous design practice rather than as a checklist applied after design completion. Huq et al. (2023) point out that accessibility issues are not solved only by technical personnel at the end of development; designers, developers, organizational managers, and testers are all involved. Oswal (2024) further argues that web accessibility involves not only compliance, but also organizational commitment. Based on the above discussion, this article defines accessibility in digital graphic design as a design principle that enables users with different bodily, perceptual, cognitive, linguistic, and technological conditions to perceive, read, understand, and use visual information equally through visual and interactive elements such as typography, colour, layout, iconography, image description, multimodal cues, and interface structure in digital visual communication.

2.2 Inclusive Design and Designing for All

If accessibility emphasizes whether design outcomes can be accessed and used by diverse users, inclusive design further concerns how such outcomes are produced. The core of inclusive design is not to add extra functions for “special users,” but to recognize human diversity from the beginning of the design process. Designing for all does not mean that a single design can apply equally and perfectly to everyone. Rather, it requires designers to actively consider differences in bodily ability, perceptual mode, cognitive rhythm, language, culture, and technological conditions during problem definition, user research, visual strategy, prototype testing, and iterative evaluation. Johansson et al.’s (2023) study of extreme-user co-design points out that co-design with disabled users can challenge standardized assumptions about users and help designers see more clearly the exclusionary mechanisms behind the concept of the “normal user.”

The basic premise of inclusive design is moving beyond the average user. Traditional digital interfaces and graphic design often assume that users have normal vision, stable attention, mainstream language competence, relatively high digital literacy, and familiar cultural symbol systems. In reality, however, users are highly diverse, including older adults, low-vision users, colour-blind users, neurodivergent users, users with cognitive impairments, users with hearing impairments, low-literacy users, cross-cultural users, and users experiencing temporary or situational limitations. From the perspective of digital accessibility and equity, Liginlal and Al-Emadi (2026) argue that, if digital services are to achieve fairness, they require not only stronger regulations, but also accessibility practices capable of responding to social difference.

Inclusive design also emphasizes participatory process. Participatory design advocates designing with people rather than designing for people. Elsayed-Ali et al. (2023) point out that participatory design aims to make users not merely sources of data or objects of feedback, but participants who jointly define problems, generate solutions, and evaluate designs. Jagtap’s (2022) study of co-design with marginalized people also reminds us that marginalized groups may still face barriers related to resources, communication, power, and representation when participating in design. Therefore, inclusive design is not only about inviting users to participate, but also about reflecting on whether participatory mechanisms are genuinely equitable.

In digital graphic design, inclusive design is closely related to accessibility education, iterative evaluation, and ability-diverse collaboration. Westin’s (2024) study of game accessibility teaching shows that accessibility and inclusive design can be incorporated into higher education curricula, enabling students to understand design responsibility across different levels of ability. Navas-Bonilla et al.’s (2025) review of technology-supported inclusive education also indicates that the key to technology-enabled inclusion does not lie in the tool itself, but in whether it can support diverse needs, participation, and accessibility-oriented practice. Xiao et al.’s (2024) systematic review of ability-diverse collaboration further points out that collaboration among users with different abilities can reveal accessibility gaps that are often overlooked in everyday digital environments. Based on the above discussion, this article defines inclusive design and designing for all as a process in digital graphic design through which user diversity recognition, participatory design, co-design, iterative accessibility testing, and culturally responsive visual strategies shift visual communication from average-user-centred form-making toward a co-constructive process oriented toward users with diverse needs.

2.3 Ethical Visual Communication in Digital Contexts

Ethical visual communication is the third core concept in this article. Accessibility concerns whether users can access and understand visual information, while inclusive design concerns whether user differences are considered in the design process. Ethical visual communication extends these concerns by asking whether visual communication is fair, transparent, respectful of user autonomy, and able to avoid new inequalities through form, content, and platform mechanisms. Digital graphic design has ethical consequences because visual hierarchy, image framing, colour emphasis, interface cues, default options, and platform visibility can shape attention, emotional judgment, identity understanding, and behavioural choice.

Representation is a primary concern. Digital graphic design represents social identities through photographs, illustrations, icons, avatars, advertisements, and brand systems. Repeated stereotypical visual schemes may reinforce inequality. AI-generated images intensify this issue because biased datasets and model outputs can reproduce unequal visibility. Gorska and Jemielniak’s (2023) study shows gender bias in AI-generated images of professionals, while Locke and Hodgdon (2025) argue that gender bias in visual generative AI is also connected to AI socialization. Ethical visual communication therefore needs to examine how generative visual content represents occupation, gender, ability, and social identity.

Ethical visual communication also involves algorithmic visual bias, visual persuasion, and aesthetic exclusion. Messingschlager et al. (2026) show that bias in image-generating AI affects both image output and users’ moral perception of that bias. Tian et al.’s (2025) study of AI-generated image quality assessment further suggests that evaluation should include information clarity and emotional interaction, not only low-level visual quality. In interface design, button colour, default options, pop-up structures, and visual hierarchy may guide user choices. When such strategies exploit cognitive bias or information asymmetry, they become deceptive patterns. Pellkvist et al. (2026) argue that accessibility standards can help counter deceptive patterns, while de Jonge and Zuiderveen Borgesius (2025) caution that fair patterns still require ethical judgment and institutional constraints.

At the aesthetic level, ethical visual communication does not reject visual innovation. It asks aesthetic decisions to carry communicative responsibility. Low contrast, thin typefaces, complex motion effects, abstract icons, and dense infographics may create barriers for specific users. Možina and Brozović’s (2025) study of visibility and legibility shows the need to examine readability across media, age groups, and reading conditions. Bañuelos Capistrán’s (2025) study of art, community, and AI also shows that AI-generated images can support community-based visual practice when they involve participation, feedback, and situated interpretation. This article therefore defines ethical visual communication in digital contexts as the protection of users’ information rights, understanding, identity

dignity, and autonomy through fair representation, transparent persuasion, explainable AI-assisted imagery, anti-manipulative interface structures, and aesthetic decisions that respect user difference.

This section only defines accessibility, inclusive design, ethical visual communication, and their conceptual boundaries in digital graphic design. It does not present the thematic findings in advance. Section 4 will use coding and thematic synthesis to examine how these concepts appear in the literature as accessible visual form, participatory and anticipatory process, and ethical design responsibility.

3. Methodology

3.1 Research Design: Qualitative Thematic Review

This article adopts a qualitative thematic review to synthesize the conceptual development, thematic structure, and theoretical relationships among accessibility, inclusive design, and ethical visual communication in digital graphic design research. Unlike meta-analysis or bibliometric review, it does not calculate effect sizes or map publication trends statistically. Instead, it uses literature identification, screening, data extraction, coding, and thematic synthesis to integrate recurring concepts, arguments, and theoretical tensions across graphic design, visual communication, HCI, UX design, digital accessibility, inclusive design, design ethics, and AI-assisted visual production. Since these fields cannot be explained through a single disciplinary framework, qualitative thematic review offers a method that is both systematic and interpretive.

The methodological foundation of this study draws on reflexive thematic analysis, thematic synthesis, and systematic review reporting guidance. Thematic analysis requires conceptual decision-making, analytic reflexivity, and interpretive judgment rather than mechanical coding (Braun & Clarke, 2021). Researchers also need to clarify their assumptions, coding logic, theme development, and position in the research process (Braun & Clarke, 2022). In reflexive thematic analysis, rigour does not depend on full coder agreement, but on repeated reading, coding, comparison, and the construction of themes that answer the research questions (Byrne, 2022). This article therefore treats themes as interpretive patterns across the literature, not as simple clusters of similar viewpoints.

To avoid methodological ambiguity, this article is positioned as a qualitative thematic review rather than a strict systematic review or meta-analysis. PRISMA 2020 and PRISMA-S are used only as reporting aids for literature identification, search strategy, screening, and record management; they do not change the interpretive purpose of the review (Page et al., 2021; Rethlefsen et al., 2021).

The research design follows interpretive qualitative synthesis. It treats accessibility, inclusive design, and ethical visual communication as interrelated dimensions of digital graphic design. It asks how studies define accessibility, translate inclusive principles into design processes, and connect visual form, user diversity, and ethical responsibility. Coding follows an abductive logic. The preliminary directions proposed in Sections 1 and 2, accessible visual form, inclusive design process, and ethical visual communication, guide the review, but the final themes are revised through repeated reading and comparison of the included studies.

Methodological rigour is supported through defined databases, search terms, inclusion and exclusion criteria, a Data Extraction Matrix, a traceable coding pathway from initial codes to themes, and reflexive memos on conceptual judgment, boundary setting, and theme naming. Even under practical constraints, qualitative evidence synthesis should retain structured extraction, transparent judgment, and clear synthesis logic (Booth et al., 2024). This study follows that principle by combining qualitative interpretation with systematic documentation.

In summary, this study uses qualitative thematic review as its overall method, PRISMA-informed search and screening as procedural support, reflexive thematic analysis as the logic of coding and theme generation, and interpretive synthesis as its analytical goal. It also records numerical changes across literature identification, duplicate removal, title and abstract screening, full-text assessment, and final inclusion. This design enables the article to address RQ1 on the conceptualization and operationalization of accessibility in digital graphic design, RQ2 on inclusive design principles in digital visual communication, and RQ3 on ethical issues and theoretical tensions among accessibility, inclusion, and ethical visual communication.

3.2 Search Strategy and Selection Criteria

The literature search in this study adopted a structured search strategy to ensure that the sources covered relevant fields such as graphic design, visual communication, digital accessibility, inclusive design, and design ethics. The search was mainly conducted in Web of Science Core Collection and Scopus, supplemented by cross-checking in academic databases including ACM Digital Library, IEEE Xplore, ScienceDirect, Taylor & Francis Online, SAGE Journals, and SpringerLink. Web of Science and Scopus were selected as the core databases because they provide broad coverage of interdisciplinary literature in design studies, communication studies, HCI, computer science, and the social sciences. At the same time, ACM Digital Library and IEEE Xplore supplemented the search with conference papers on HCI, UX, accessibility, and digital interface design. Literature searching needs to be designed according to the review purpose and topic complexity, rather than by simply expanding the search scope (Klerings et al., 2023). In addition, search strategy formulation is an important component of quality control in evidence synthesis, because keyword combinations, Boolean logic, and search boundaries directly affect the completeness and relevance of the included literature (MacFarlane et al., 2022).

The search period of this article was set as 2021–2026. This time frame meets the requirement for literature from within the past five years and covers the research stage after COVID-19, during which digital services, online interfaces, AI-generated images, digital inclusion, and accessibility standards developed rapidly. The search language was limited to English, and the literature types included peer-reviewed journal articles, conference proceedings, review articles, and book sections. Since this article is an SSCI-oriented thematic review, the studies formally included in the analysis were required to come from sources indexed by Web of Science or Scopus, or from peer-reviewed publication channels retrievable through mainstream indexing databases, such as ACM, IEEE, Springer, Taylor & Francis, SAGE, Elsevier, and BMJ.

The keyword design of this article used three groups of conceptual combinations. The first group focused on the design field, including “graphic design,” “visual communication,” “digital design,” “interface design,” “UX design,” “web design,” and “digital visual media.” The second group focused on accessibility and inclusion, including “accessibility,” “digital accessibility,” “web accessibility,” “inclusive design,” “universal design,” “designing for all,” “digital inclusion,” “assistive technology,” and “user diversity.” The third group focused on ethical visual communication, including “visual ethics,” “ethical design,” “design ethics,” “dark patterns,” “deceptive patterns,” “visual bias,” “AI-generated images,” “algorithmic bias,” and “responsible design.” During the search process, Boolean operators were used to form combined searches, such as “graphic design” AND accessibility, “visual communication” AND “inclusive design,” “digital design” AND “web accessibility,” “AI-generated images” AND “visual ethics,” and “interface design” AND “deceptive patterns.”

The final search was conducted between January 2026 and June 2026. Searches were performed separately in Web of Science Core Collection, Scopus, ACM Digital Library, IEEE Xplore, ScienceDirect, Taylor & Francis Online, SAGE Journals, and SpringerLink. Results were exported into a reference management file, duplicates were removed, and titles, abstracts, keywords, and full texts were screened against the inclusion and exclusion criteria. The main search terms, database coverage, language limit, document-type limit, search period, inclusion criteria, and exclusion criteria are reported in Table 1, while the screening results are summarized in Table 2. The representative search strings reported above indicate how the three conceptual areas of design, accessibility/inclusion, and ethical visual communication were combined during the search process.

Table 1 summarizes the search strategy, database coverage, and selection criteria of this article. The purpose of this table is not to replace the textual explanation, but to clarify the search boundaries, keyword combinations, and screening criteria of the study. To further enhance methodological traceability, Table 2 supplements the literature search and screening results by reporting the specific numbers for different database sources, duplicate removal, title and abstract screening, full-text assessment, and final thematic synthesis.

Table 1 Search Strategy and Selection Criteria

Methodological item	Specification in this review
Review type	Qualitative thematic review
Core databases	Web of Science Core Collection; Scopus
Supplementary databases	ACM Digital Library; IEEE Xplore; ScienceDirect; Taylor & Francis Online; SAGE Journals; SpringerLink
Search period	2021–2026
Language	English
Document types	Peer-reviewed journal articles; conference proceedings; review articles; scholarly book sections
Core design terms	“graphic design”; “visual communication”; “digital design”; “interface design”; “UX design”; “web design”; “digital visual media”
Accessibility and inclusion terms	“accessibility”; “digital accessibility”; “web accessibility”; “inclusive design”; “universal design”; “designing for all”; “digital inclusion”; “user diversity”
Ethics-related terms	“visual ethics”; “ethical design”; “design ethics”; “dark patterns”; “deceptive patterns”; “visual bias”; “AI-generated images”; “algorithmic bias”; “responsible design”
Inclusion criteria	The study must address digital graphic design, visual communication, interface design, UX design, accessibility, inclusive design, ethical design, or AI-mediated visual communication; it must be relevant to at least one RQ.
Exclusion criteria	Studies focused only on architecture, industrial product design, clinical assistive devices, software engineering without visual communication relevance, non-academic commentary, duplicate records, inaccessible full texts, or studies outside the 2021–2026 timeframe.
Screening basis	Title, abstract, keywords, full-text relevance, methodological quality, and relevance to RQ1/RQ2/RQ3
Final synthesis logic	Descriptive coding, category development, theme generation, and interpretive synthesis

Table 2 Literature Search and Screening Results

Screening stage	Number of records	Notes
Records identified from Web of Science Core Collection	63	Core database; design, communication, accessibility and social science literature
Records identified from Scopus	71	Core database; interdisciplinary design, HCI, UX and digital inclusion literature
Records identified from ACM Digital Library / IEEE Xplore	52	HCI, accessibility, interface design and AI-related visual communication literature
Records identified from publisher databases	55	ScienceDirect, Taylor & Francis Online, SAGE Journals, SpringerLink and other publisher platforms
Total records identified	241	Initial search results before de-duplication
Duplicates removed	52	Duplicate records across databases removed

Records screened by title and abstract	189	Records assessed for topical relevance
Records excluded after title and abstract screening	98	Excluded for weak relevance to digital graphic design, accessibility, inclusive design or ethical visual communication
Full-text articles assessed for eligibility	91	Full texts assessed against inclusion and exclusion criteria
Full-text articles excluded	45	Excluded due to non-digital focus, lack of visual communication relevance, limited connection to the RQs or insufficient scholarly relevance
Final studies included in thematic synthesis	46	Core analytical sample supporting the thematic findings
Methodological/contextual references	11	Used for methodology, conceptual background and contextual discussion, but not coded as core analytical studies

Table 1. PRISMA-informed literature identification and screening flow.

The figure distinguishes the 46 core analytical studies used for thematic synthesis from the 11 methodological/contextual references used only for review design and conceptual framing.

Full-text eligibility was assessed through four criteria: direct relevance to digital graphic design or visual communication; clear connection to accessibility, inclusive design, or ethical visual communication; contribution to at least one research question; and sufficient conceptual or empirical material for thematic coding. Full-text exclusions were recorded when studies lacked a digital context, had weak visual communication relevance, focused mainly on technical implementation, did not address the RQs, or offered limited analytical contribution.

Research method was not used as an exclusion criterion. Qualitative studies, systematic reviews, design case studies, experimental usability studies, HCI conference papers, and conceptual papers were eligible when they provided conceptual or empirical material for thematic synthesis. This approach fits the interpretive aim of thematic review. Evidence synthesis should select evidence types and synthesis methods according to the research purpose, rather than apply one fixed review model mechanically (Nussbaumer-Streit et al., 2025). Because this article examines the relationships among accessibility, inclusion, and ethics in digital graphic design, it requires literature from different methodological traditions.

The screening process identified 241 records, removed 52 duplicates, screened 189 records by title and abstract, assessed 91 full texts, and retained 46 studies as the core analytical sample. The relationship between the retained studies, the research questions, and the theme development process is reported within the main text through the literature classification table, the sample Data Extraction Matrix, and the coding pathway table. These tables show how the analytical sample was organized, how representative studies were linked to the research questions, and how the final themes were generated.

Because the literature directly labelled as “digital graphic design” remains limited, this review also included adjacent studies from HCI, accessibility studies, interface design, AI ethics, digital government, inclusive education, and e-book accessibility. These studies were not treated as direct substitutes for graphic design research. Instead, they were included when they provided transferable evidence about visual form, information hierarchy, image selection, typography, colour contrast, data visualization, alternative text, interface navigation, or visual representation. This transfer logic allowed the review to synthesize how findings from adjacent fields can inform digital graphic design as a visual communication practice.

Taken together, Table 1 and Table 2 provide the procedural basis for literature identification and screening, while the following section explains how the retained studies were classified, extracted, coded, and synthesized. This structure keeps the review process self-contained within the main text.

3.3 Data Extraction, Coding, and Thematic Synthesis

After screening, the 46 core analytical studies were entered into a structured Data Extraction Matrix. Each study was recorded by author/year, discipline, digital context, design focus, accessibility focus, inclusive principle, ethical concern, user group, research method, key finding, RQ relevance, and theme contribution. The purpose of this extraction process was to transform the literature into comparable and codable analytical units, rather than to summarize studies descriptively. The classification of the included references is presented in Table 3, while Table 4 provides a sample Data Extraction Matrix to illustrate how representative studies were linked to the research questions and theme contributions. Table 5 further shows how data extraction, coding, and theme generation were connected.

In this review, core analytical studies refer to the 46 studies that directly addressed at least one of the three research questions and were included in coding and thematic synthesis. Methodological or contextual references refer to the 11 studies used to justify the review design, explain thematic analysis, support PRISMA-informed reporting, or provide broader conceptual background. These references informed the methodological and theoretical framing of the article, but were not treated as direct evidence for the thematic findings.

Table 3 Literature classification

Reference group	Function in this review	Examples
Direct graphic design / visual communication studies	Directly support the graphic design and visual communication focus of the review.	Barriga-Fray & Samaniego (2026); Massaguer & Alcaraz-Martínez (2024); Bucio-Gutiérrez et al. (2025); Možina & Brozović (2025); Zou et al. (2025)

Accessibility / HCI / interface studies	Provide transferable evidence on visual access, interface hierarchy, data visualization, alternative text, navigation, and user barriers.	Lim et al. (2023); Singh et al. (2024); Fan et al. (2023); Joyner et al. (2022); Chundury et al. (2024); Huq et al. (2023); Oswal (2024)
Inclusive design / participatory design studies	Support the process-oriented interpretation of inclusive design, co-design, user diversity, and participatory evaluation.	Johansson et al. (2023); Elsayed-Ali et al. (2023); Jagtap (2022); Xiao et al. (2024); Wacnik et al. (2025); Chapman et al. (2025); Johansson et al. (2026)
AI imagery / visual ethics studies	Support ethical visual communication, AI-generated visual representation, bias, autonomy, and responsible image use.	Gorska & Jemielniak (2023); Locke & Hodgdon (2025); Barve et al. (2026); Collyer-Hoar et al. (2025); Mack et al. (2026); Messingschlager & Appel (2026); Tian et al. (2025); Pellkvist et al. (2026)
Methodological / contextual references	Support review design, thematic analysis, PRISMA-informed reporting, evidence synthesis, and conceptual background; these references were not coded as core analytical evidence.	Braun & Clarke (2021, 2022); Byrne (2022); Page et al. (2021); Rethlefsen et al. (2021); Booth et al. (2024); Klerings et al. (2023); MacFarlane et al. (2022); Nussbaumer-Streit et al. (2025); Rogers & Seaborn (2023); Cooper et al. (2022)

This classification clarifies that the 46 core analytical studies were not homogeneous in disciplinary origin. They were selected because they contributed evidence to the review’s three research questions, while the 11 methodological/contextual references supported the review procedure and conceptual framing.

To enhance the auditability of the data extraction process, this article further provides a Sample Data Extraction Matrix. This table does not present the complete dataset, but demonstrates how representative studies moved from bibliographic information, field, digital context, design focus, and key finding into the research questions and were further connected to final theme contributions. The sample studies cover RQ1, RQ2, and RQ3 respectively, in order to show the basis on which the three themes of accessible visual form, inclusive design process, and ethical visual communication were developed.

Table 4 Sample Data Extraction Matrix

Author / year	Field	Digital context	Design focus	User group	Key finding	Relevance to RQ	Theme contribution
Lim et al. (2023)	Visual communication / accessibility	Public data interface	Typography, colour, layout, information hierarchy	Low vision users	Visual structure and interface presentation affect information access and interpretation.	RQ1	Accessible visual form
Singh et al. (2024)	Web accessibility / digital government	Educational websites	WCAG-based accessibility, navigation structure, alternative text, form labels	General users; users with accessibility needs	Accessibility barriers often emerge from weak page structure, contrast errors and insufficient semantic support.	RQ1	Structural understandability
Sajek et al. (2025)	Colour accessibility / web design	Web resources	Colour schemes, contrast, visual differentiation	Users with colour blindness	Colour-based design choices may reduce information clarity for users with colour vision deficiency.	RQ1	Colour accessibility
Johansson et al. (2023)	Inclusive design	Co-design process	User participation, extreme users, inclusive design process	Disabled users	Extreme users challenge average-user assumptions and reveal exclusionary	RQ2	Participatory design process

Xiao et al. (2024)	HCI accessibility research	/	Ability-diverse collaboration	Co-design, collaborative accessibility, ability-based participation	Ability-diverse users	design defaults. Ability-diverse collaboration can expose accessibility gaps but requires careful design of participation structures.	RQ2	Inclusive design process
Wacnik et al. (2025)	Participatory design		Digital and service design contexts	Iterative design, stakeholder participation, co-design practice	End users and stakeholders	Participatory design strengthens relevance and accountability by involving users across design stages.	RQ2	Anticipatory and participatory process
Gorska & Jemielniak (2023)	AI culture	visual	AI-generated images	Representation bias, professional imagery	Gender representation	AI-generated professional images reproduce gendered stereotypes and unequal visibility.	RQ3	Ethical visual communication
Collyer-Hoar et al. (2025)	AI-generated imagery design ethics	/	Text-to-image visual systems	Gender expression, visual stereotypes, identity representation	Gender-diverse representation	AI-generated imagery may simplify complex identities through fixed visual templates.	RQ3	Representation responsibility
Pellkvist et al. (2026)	HCI / deceptive patterns		Digital interfaces	Accessibility, deceptive patterns, interface manipulation	Users vulnerable to deceptive design	Accessibility standards can help resist deceptive patterns and protect user autonomy.	RQ3	Anti-manipulation and design responsibility

As shown in Table 4, the Data Extraction Matrix served as a bridge between individual studies and cross-study thematic synthesis. Each study was not only summarized by topic, but also assessed according to its relevance to the Research Questions and its contribution to theme development. This procedure helped ensure that the final themes were grounded in traceable analytical evidence rather than unsystematic narrative selection.

Screening, data extraction, and initial coding were conducted by the primary reviewer. No independent dual-screening protocol or coder-agreement statistic was used. To improve dependability, borderline records were revisited after full-text reading, inclusion decisions were documented in the extraction matrix, and theme boundaries were checked through repeated comparison, negative case checking, and reflexive memoing. This procedure and its limitation are reported to make the interpretive process transparent.

After data extraction was completed, this article moved to the coding stage. The coding adopted abductive thematic coding, combining deductive sensitizing concepts with inductive coding. The deductive sensitizing concepts were derived from the conceptual background established in Sections 1 and 2, including accessibility, inclusive design, ethical visual communication, accessible visual form, participatory process, user diversity, visual bias, deceptive patterns, and AI-generated imagery. At the same time, the researchers maintained inductive openness when reading the literature, allowing new codes to emerge from the studies. For example, if certain studies repeatedly discussed cultural accessibility, platform-mediated exclusion, or automated accessibility checking, these concepts were also incorporated into the initial coding rather than being forcibly assigned to the existing framework.

The coding process in this article consisted of three levels. The first level was open coding, which was used to identify specific concepts and design issues in the literature, such as colour contrast, readable typography, alternative text, screen-reader compatibility, cognitive accessibility, participatory testing, co-design, user diversity, visual stereotypes, dark patterns, AI-generated bias, and ethical representation. The second level was category development, which was used to merge related codes into higher-level conceptual categories, such as accessible visual form, inclusive design process, user participation, ethical representation, platform mediation, visual manipulation, and responsible AI-assisted design. The third level was theme generation, in which explanatory relationships were established among categories to form thematic findings capable of addressing the research questions.

Table 5 presents the analytical pathway from the research questions to data extraction, coding, and theme generation. This table demonstrates the operational logic of the methodology and provides the structural basis for the subsequent Section 4, Thematic Findings and Discussion.

Table 5 Data Extraction, Coding, and Theme Generation Process

Research question	Data extraction focus	Initial codes	Higher-level categories	Expected thematic output
RQ1: How has accessibility been conceptualized and operationalized in digital graphic design literature?	Definitions of accessibility; visual design elements; accessibility standards; user barriers; interface features	colour contrast; typography; layout hierarchy; icon clarity; alternative text; screen-reader compatibility; cognitive load	accessible visual form; perceptual access; cognitive access; structural understandability	Accessibility as accessible visual form
RQ2: What inclusive design principles are emphasized in digital visual communication and graphic design studies?	User diversity; participatory design; co-design; testing process; design iteration; inclusive education	co-design; participatory feedback; ability-diverse users; older adults; neurodiversity; cultural responsiveness	inclusive design process; designing beyond average user; anticipatory design; iterative evaluation	Inclusive design as participatory and anticipatory process
RQ3: What ethical concerns emerge in the relationship between accessibility, inclusion, and visual communication in digital contexts?	Ethical issues; visual representation; AI bias; manipulation; platform exclusion; user autonomy	visual bias; stereotype; AI-generated imagery; dark patterns; misleading hierarchy; aesthetic exclusion	ethical communication; representation responsibility; anti-manipulation; responsible AI design	Ethical visual communication and design responsibility

The thematic synthesis did not count code frequency alone. It examined how codes and categories related conceptually. Colour contrast and typography were read not only as accessibility indicators, but also as issues of visual equality and information rights. Co-design and participatory testing were treated not only as user research methods, but also as part of the ethical basis of inclusive design. AI-generated image bias and dark patterns were interpreted as problems of representation responsibility and autonomy protection in digital visual communication. This interpretive approach follows the view that HCI research synthesis needs both methodological rigour and epistemological inclusivity because knowledge in the field is produced through varied forms (Rogers & Seaborn, 2023).

Theme refinement relied on repeated comparison and negative case checking. Repeated comparison examined whether studies grouped under the same category addressed the same issue and whether tensions existed across categories. Negative case checking identified studies that did not fully support the preliminary themes. For instance, some studies defined accessibility mainly as compliance, while others treated it as ethical responsibility. Some emphasized the efficiency of automated accessibility tools, whereas others stressed human judgment and user testing. Keeping these tensions helped the synthesis avoid a one-sided account of accessibility, inclusion, and ethics in digital graphic design.

Reflexive memos were used to record interpretive decisions during theme naming and boundary setting. In reflexive thematic analysis, researcher subjectivity is not simply a bias to remove, but part of how analysis is produced (Braun & Clarke, 2021). The memos documented why studies were assigned to accessibility, inclusion, or ethics; why certain codes were merged or separated; and how the final themes answered the research questions. This also reflects the value of combining systematic review procedures with thematic analysis to identify staged themes, structural tensions, and methodological commitments in research practice (Cooper et al., 2022).

Based on the 46 core analytical studies, this article developed three thematic findings. The first is accessibility as accessible visual form, explaining how typography, colour, layout, iconography, and multimodal cues shape accessibility in digital graphic design. The second is inclusive design as participatory and anticipatory process, showing how inclusive principles move from usability outcomes to user participation and recognition of human diversity. The third is ethical visual communication and design responsibility, explaining how representation, AI-generated bias, deceptive patterns, aesthetic exclusion, and platform inequality make accessibility and inclusion ethical issues in visual communication. This methodological pathway therefore supports both the organization of the literature and the later thematic discussion.

4. Thematic Findings and Discussion

Based on the qualitative thematic review method described above, this section conducts an interpretive synthesis of the included literature and develops three thematic findings around the three research questions. The first theme responds to RQ1 and shows that

accessibility in the digital graphic design literature should not be understood as a single technical standard, but should be interpreted as an accessible visual form constituted by typography, colour, layout, iconography, alternative text, and multimodal cues. The second theme responds to RQ2 and indicates that inclusive design in digital visual communication is manifested as a participatory and anticipatory process, through which diverse user experiences are incorporated into the early stages of design through user diversity, co-design, user testing, and iterative evaluation. The third theme responds to RQ3 and emphasizes that ethical visual communication is not only a matter of visual ethics at the level of content, but also involves design responsibilities in digital contexts, including AI-generated imagery, visual bias, deceptive patterns, aesthetic exclusion, and platform-mediated inequality. These three themes are not merely parallel findings. Instead, they constitute a progressive framework: accessible visual form addresses whether visual information can be perceived and understood; the inclusive design process addresses who is considered and who can participate in the design process; and ethical visual communication further asks whether visual communication is fair, transparent, respectful of user autonomy, and capable of avoiding exclusion.

Across the 46 core analytical studies, three broad patterns were identified. The most common pattern concerned accessible visual form, including typography, colour contrast, layout hierarchy, alternative text, data visualization, and interface structure. A second pattern focused on inclusive design process, especially user diversity, co-design, participatory feedback, and iterative testing. A third pattern concerned ethical visual communication, including AI-generated imagery, visual bias, deceptive patterns, representation, and user autonomy. The studies also differed in emphasis. Some treated accessibility mainly as technical compliance, while others framed it as visual equality and user agency. Some discussed participation as late-stage feedback, whereas others treated co-design as an early design condition. Ethical studies often addressed AI or interface ethics, but fewer examined ethical review within actual graphic design workflows. These patterns show both the value and the limitation of the current literature.

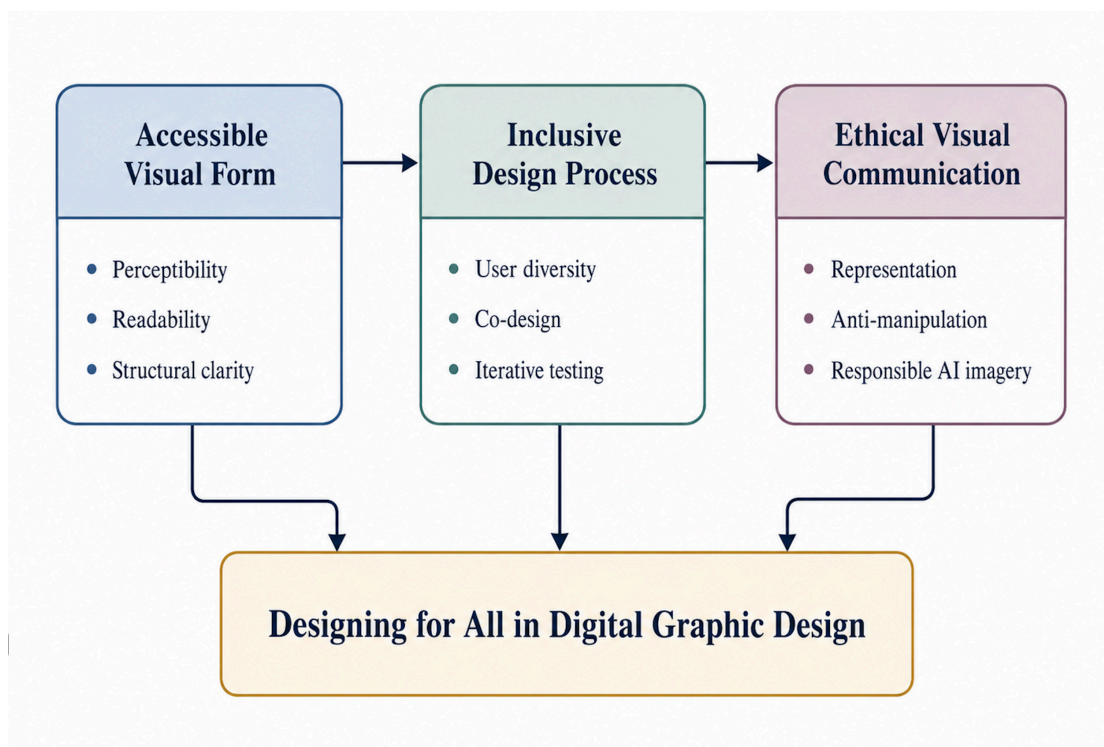


Figure 2. Thematic Framework of Designing for All in Digital Contexts.

The figure presents the core thematic structure of this article. Accessible visual form constitutes the foundational layer of digital graphic design, emphasizing perceptibility, readability, and structural clarity. The inclusive design process constitutes the methodological layer, emphasizing user diversity, co-design, and iterative testing. Ethical visual communication constitutes the responsibility layer, emphasizing representation, anti-manipulation, and responsible AI imagery. Together, these three layers ultimately point toward designing for all in digital graphic design.

4.1 Accessibility as Accessible Visual Form

The first theme shows that accessibility in digital graphic design is becoming a quality of visual form itself, rather than an external standard added after design completion. Digital accessibility is not limited to minimum technical indicators for web pages or interfaces. It also concerns whether visual presentation, information structure, and interaction design support perceptual, cognitive, and operational access for diverse users. This is especially clear in data visualization and dashboard design, where information is communicated through charts, colour, spatial relations, and interaction. These visual forms are not automatically accessible to blind and low vision users. Without structured descriptions, semantic hierarchy, and screen reader navigation, charts may appear on screen while remaining inaccessible in practice (Joyner et al., 2022).

Accessible visual form first requires a clear visual and semantic structure. Screen reader users need more than a brief textual summary of a chart. They need a navigable structure that supports exploration, comparison, orientation, and understanding of data relationships. This means that titles, coordinates, legends, data points, and annotations should not depend only on colour or spatial position. They also need textual order, semantic labelling, and explicit relationships that assistive technologies can recognize. Accessibility is therefore not a simple translation from image to text. It is the reorganization of visual structure into information structures available through different sensory pathways.

Colour, contrast, and typography are also central. Digital graphic design often uses colour coding, font weight, spacing, and layout density to create hierarchy, but these strategies can exclude users when accessibility is ignored. Colour-only categories may disadvantage users with colour vision deficiency. Low contrast reduces readability for older adults and low vision users. Dense infographics increase cognitive load. Research on online data visualizations shows that many public charts lack textual summaries, keyboard navigation, and accessible interaction paths, placing screen reader users at a disadvantage in news, education, and public information contexts (Fan et al., 2023). Accessible visual form is thus tied to public information access and digital citizenship.

This theme also requires a broader understanding of visual clarity. In digital accessibility, clarity means that information can be perceived, explored, and interpreted through multiple pathways. Research on blind and low vision information professionals shows that users need not only chart results, but also control, agency, and interpretive autonomy during data analysis (Chundury et al., 2024). Accordingly, design should not simply present conclusions. It should enable users to compare data, move through information structures, and interpret content according to their own needs.

This article therefore conceptualizes accessibility in digital graphic design as accessible visual form. It includes perceptibility, readability and structural clarity, and interactional accessibility. In response to RQ1, the literature shows that accessibility is no longer operationalized only as compliance with standards. It is increasingly understood as a design quality formed through visual form, information structure, and user agency.

4.2 Inclusive Design as Participatory and Anticipatory Process

The second theme shows that inclusive design in digital visual communication depends on how the design process recognizes human diversity before final usability is assessed. Accessibility often evaluates whether an outcome can be used; inclusive design asks how participation, process, and anticipation shape that outcome. Participatory design is iterative and flexible, and it can improve relevance, fairness, and applicability through sustained stakeholder or end-user involvement (Wacnik et al., 2025). This matters for digital graphic design because visual exclusion is often invisible in designers' internal judgments and becomes evident only when diverse users engage with interfaces, images, infographics, or public digital services.

Inclusive design first requires moving beyond the average-user assumption. Digital graphic design often presumes normal vision, stable attention, mainstream language competence, familiar cultural codes, and high digital literacy. Such assumptions can exclude disabled users, older adults, neurodiverse users, low-literacy users, and cross-cultural users. Research on health communication co-design shows that disabled people's participation varies by stage and depth. When they are invited only to comment during final testing, rather than to shape early framing and message development, co-design risks becoming procedural rather than substantive (Chapman et al., 2025). Inclusive visual communication should therefore involve diverse users in problem definition, visual strategy, and prototype evaluation.

Participation also needs decision-making weight. Co-design is not simply a process of collecting opinions; it allows users to influence design direction, visual language, information organization, and evaluation criteria. Research on user participation in online digital services shows that online co-design must clarify participants' technological conditions, communication channels, schedules, support mechanisms, and interaction rules. Without these arrangements, participation may reproduce exclusion (Johansson et al., 2026). In digital graphic design, users can help identify accessibility barriers, assess whether images and symbols are respectful, judge visual hierarchy, and report actual reading experiences across platforms, devices, and contexts.

Inclusive design is also anticipatory. Designers should identify possible barriers before exclusion occurs. Research on digital public services shows that digital transformation can expand social exclusion if accessibility, digital literacy, and institutional support are insufficient, even when efficiency improves (Djatkiko et al., 2025). For graphic design, anticipatory practice includes early contrast standards, caption policies, plain-language strategies, icon testing, alternative text protocols, and user diversity review. These procedures do not weaken professional judgment. They place it in dialogue with diverse user experience. In response to RQ2, the literature emphasizes beyond-average-user thinking, participatory design, co-design, iterative accessibility testing, and contextual responsiveness. Inclusive design does not mean adding functions for minority users after the fact. It treats human diversity as a condition of visual communication from the beginning.

4.3 Ethical Visual Communication and Design Responsibility

The third theme places accessibility and inclusion within ethical visual communication. Digital graphic design is not a neutral surface treatment. Image selection, visual hierarchy, interface emphasis, algorithmic generation, and platform circulation can influence judgment, identity formation, and user choice. When digital design neglects accessibility or inclusion, the result is more than a usability problem. It may become an ethical problem. With AI-generated images now entering graphic design workflows, visual ethics has expanded from representation to algorithmic responsibility.

In digital graphic design, ethical visual communication concerns the ways typography, colour, layout, image selection, interface hierarchy, and AI-generated imagery shape visibility, autonomy, and representation. These issues appear in social media posters, public

health campaigns, brand identity, educational infographics, public service interfaces, advertising images, and data visualizations. Visual ethics should therefore be treated as part of design judgment, rather than as an external review added after production.

AI-generated imagery makes visual bias more visible. Text-to-image models can produce polished images quickly, yet they may reproduce stereotypes embedded in training data. Studies show that AI-generated images can display bias related to gender, race, profession, culture, and disability, leading some groups to be overrepresented, stereotyped, or visually marginalized (Barve et al., 2026). In graphic design, this bias becomes part of communication itself. It may affect who appears in public campaigns, how cultural symbols are selected, how bodies are represented in advertising, or how people are visualized in education and public service materials. Without review, model bias can become design content.

Ethical visual communication also concerns user autonomy. In digital interfaces, button size, colour, position, pop-up logic, default options, and visual cues guide user choice. These strategies are legitimate when they improve understanding and navigation. They become deceptive when they exploit cognitive bias, information asymmetry, or attentional pressure. Dark patterns manipulate behaviour in areas such as privacy, consumption, subscription, and data authorization. From an ethical perspective, a visually refined interface remains problematic if it hides exit paths, weakens refusal options, or makes consent appear as the default choice.

Ethics also requires reconsidering aesthetics. Originality, visual appeal, brand consistency, and stylistic distinction remain important, but aesthetic choices can exclude users when they reduce access or comprehension. Low contrast, thin typefaces, complex motion effects, abstract icons, minimal navigation, and dense infographics may all create barriers. Research on gender expression in image-generation systems shows that AI often represents gender through narrow appearance features and bodily signs, reducing complex identities to predictable templates (Collyer-Hoar et al., 2025). This links aesthetic simplification with representational bias: fixed visual templates can weaken diverse expression.

Design responsibility must therefore extend across the visual production chain. Designers, platforms, AI tool developers, brands, and public institutions all shape digital visual communication. Accessibility cannot depend only on individual designers, and AI image ethics cannot rely only on user intuition. Dataset transparency, prompt documentation, bias evaluation, community feedback, and interface support are needed. Research on disability bias in AI images shows that generative systems may produce stereotypical images of disabled people, and that interface-level support can help users identify and evaluate such bias (Mack et al., 2026). Ethical visual communication is therefore a responsibility mechanism across tool selection, image generation, visual editing, user testing, and release. In summary, designing for all in digital graphic design cannot be reduced to an accessibility checklist or an abstract inclusion claim. Accessible visual form provides the basis for perceptible, readable, and operable information. Inclusive process moves design beyond the average-user assumption through user diversity, co-design, and iterative testing. Ethical visual communication connects design decisions with representation, autonomy, fairness, and responsibility. Together, these dimensions support the article's main argument: digital graphic design should move from aesthetic-centred visual production toward accessible, inclusive, and ethically responsible visual communication.

5. Conclusion

This qualitative thematic review examined how accessibility, inclusive design, and ethical visual communication intersect in digital graphic design. Its main argument is that digital graphic design should not be limited to visual appeal, brand identity, or communication efficiency. In digital environments, it also structures how users perceive, understand, judge, and act. Web interfaces, mobile applications, social media images, public service interfaces, data visualizations, and AI-generated visual content are now part of everyday information systems. Accessibility, inclusion, and ethics should therefore function as internal criteria for evaluating digital graphic design.

Responding to RQ1, the review shows that accessibility in this field is increasingly understood as accessible visual form rather than as a technical checklist. It includes typography, colour contrast, layout hierarchy, icon clarity, alternative text, multimodal cues, semantic structure, and interactional access. Research indicates that accessible digital resources affect disabled users' access to information and their participation in education, public services, cultural life, and digital society (Silva et al., 2025). Accessibility should therefore enter the early stages of visual concept development, information architecture, interface structure, and content presentation. Visual quality includes aesthetic coherence, but also perceptibility, readability, understandability, and navigability.

Responding to RQ2, the review defines inclusive design as a participatory and anticipatory process. It does not add extra functions for "special users" after design completion. Instead, it asks designers to move beyond the average-user assumption and consider older adults, low-vision users, neurodiverse users, low-literacy users, cross-cultural users, and users with different technological conditions from the beginning. Digital inclusion depends on interface functions, but also on digital literacy, situational constraints, social resources, and institutional support. User research, co-design, participatory feedback, iterative evaluation, and contextual responsiveness help translate user experience into design decisions. In this sense, inclusive design shifts attention from whether the final outcome is usable to whose experience has shaped the visual strategy.

Responding to RQ3, the review argues that ethical visual communication extends accessibility and inclusion. Digital visual communication does more than display information. Image selection, visual hierarchy, interface cues, algorithmic generation, and platform circulation shape attention, choice, and identity imagination. With AI-assisted visual production, graphic design ethics now includes transparency, human control, bias detection, and contextual appropriateness, not just efficiency, creativity, or usability (Sun & Liu, 2025). Mobile generative AI tools may expand students' creative capacity and learning efficiency, yet they also require design educators to address authorship, judgment, and ethical literacy (Meng, 2025). Designers must therefore assess whether visual content is fair, clear, explainable, non-manipulative, accessible, and resistant to reproducing social bias through AI-generated imagery.

The article makes three theoretical contributions. First, it reframes accessibility as a foundational principle of digital visual communication and connects it with typography, colour, layout, iconography, image description, and multimodal communication. Second, it explains inclusive design as a process-oriented logic in which designing for all requires sustained attention to user diversity, co-design, and iterative testing. Third, it links ethical visual communication with graphic design by showing that visual form, platform mediation, and AI-generated content can all have ethical consequences. Together, these arguments support a three-dimensional framework: accessible visual form, inclusive design process, and ethical visual communication.

This framework contributes to four related areas. For graphic design, it clarifies that accessibility is a matter of visual form and design judgment, not only technical compliance. For visual communication, it explains how representation, hierarchy, and image selection shape information access and user autonomy. For design education, it suggests that accessibility literacy, inclusive methods, and AI ethics should be integrated into visual communication curricula. For arts-and-technology research, it shows how AI-generated imagery should be evaluated not only for creativity or efficiency, but also for bias, representation, transparency, and situated visual responsibility.

The practical implications concern designers, educators, platforms, and institutions. For designers, accessibility is a professional competence rather than a constraint on creativity. It should guide decisions about hierarchy, colour systems, typography, images, captions, alternative text, and navigation. For design educators, accessibility literacy, inclusive design methods, and AI ethics should be embedded in visual communication curricula. Human-centred AI research also stresses human agency, transparency, trust, and contextual judgment in AI system design and use (Schmager et al., 2025). This means that students need critical judgment in AI-assisted environments, not only technical fluency with generative tools. For platforms and institutions, inclusive visual communication requires organizational guidelines, accessibility review, user testing protocols, and responsible AI policies.

This review has limitations. It relies mainly on English-language literature and may not fully reflect practices in non-English contexts, especially in Asian, African, Latin American, and Indigenous settings. It is based on literature synthesis rather than interviews, case studies, or design ethnography, so it cannot directly observe how designers, users, and platforms negotiate accessibility and inclusion in actual projects. In addition, screening and coding were conducted by a primary reviewer rather than by a full independent dual-review process. This may introduce interpretive bias, although structured extraction, documented relevance mapping, negative case checking, and reflexive memos were used to strengthen transparency. Generative AI technologies, policies, and visual production practices also continue to change, so the analysis of AI-generated visual content will need further updating.

Future research can examine how digital graphic design projects integrate accessibility testing, co-design, and ethical review in real workflows. Interviews and participatory studies can further explore how disabled users, older adults, neurodiverse users, and low-literacy users experience exclusion and inclusion in digital visual communication. Further work is also needed on the governance of AI-assisted graphic design, including dataset bias, prompt documentation, visual representation audits, human-in-the-loop review, and responsible design education. Overall, this article argues that digital graphic design should become more accessible, inclusive, and ethically responsible, rather than simply more efficient or visually striking. Designing for all can become a core principle only when visual form, design process, and communication ethics are evaluated together.

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