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Proceedings of IASDR 2023: Life-changing Design

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THE 2023

IASDR Congress

Life-
changing
design

Milan 9th–13th October

PROCEEDINGS OF IASDR 2023

EDITORS:

Daniela De Sainz Molestina

Laura Galluzzo

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Davide Spallazzo



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Life-Changing Design

Proceedings of the 10th Congress of the
International Association of Societies of
Design Research (IASDR 2023)

EDITORS:

Daniela de Sainz Molestina

Laura Galluzzo

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The Tenth IASDR congress. An Introductory Address from the IASDR Board

IASDR 2023 is the 10th biennial congress of IASDR, and the first to take place after the crisis of COVID-19. With this congress we re-confirm the importance of discussion and debate for the network of researchers in design, as well as the importance of developing younger researchers for the future of the Association.

The International Association for Societies of Design Research (IASDR) was established in 2005 through a collaboration of four academic societies: Chinese Institute of Design (CID), the Design Research Society (DRS), Korean Society for Design Science (KSDS) and Japanese Society for the Science of Design (JSSD).

The history of international collaboration in Design Research in the Asian region can be traced back to 1996 when JSSD organized the first Japan-China Industrial Design Symposium which was hosted by Beihang University in Beijing, 1996. This started a series of international conferences in design research known as the Asian Design Conference. Conferences took place in 1997 (Daejeon, Korea at KAIST), 1998 (Taichung, Taiwan at National Taichung University of Science and Technology), 1999 (Nagaoka, Japan at Nagaoka University of Technology), 2001 (Seoul by National Seoul University), and 2003 (Tsukuba, Japan at Tsukuba International Congress Center). At the 2003 congress – the 6th Asian Design Conference – the three Asian academic societies agreed to welcome the Design Research Society into a new association.

We thus began the International Association of Societies of Design Research for the field of design research in 2005, in Taiwan. Since that time, we have enhanced the network of researchers and fields of design research and promoted design research education. We will continue to build this incomparable network of design research as we move towards our 2025 congress, at Tapei, Taiwan.

Our deepest thanks go to Luisa Collina, and the entire Politecnico Milano team who have worked so hard, as hosts for IASDR2023, to ensure its success. Your leadership throughout the process has been excellent and we think the result will be much appreciated by the IASDR design research community.

Toshimasa Yamanaka
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On behalf of the IASDR Board
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Life-Changing Design.

Introduction to the Tenth IASDR congress

The International Association of Societies of Design Research (IASDR) has long been at the forefront of advancing design research, providing an international platform for researchers, scholars, and practitioners to engage in robust discussions, share insights, and explore the ever-evolving landscape of design research. IASDR 2023, the association's 10th Congress, stands as a pivotal juncture in the trajectory of design research, offering a comprehensive perspective on its current state while charting its future directions.

Over the past decade, design research has witnessed a remarkable transformation. From its roots in aesthetic considerations and form-centric approaches, design research has evolved into a multifaceted discipline, extending its influence beyond traditional boundaries. Contemporary design literature now encompasses a wide array of facets, each addressing critical aspects of design's impact on diverse domains, including organisational culture, public policies, product development, and the creation of immersive spaces, services and systems. This transformation underscores the dynamic nature of design research, as it continuously adapts to our society's changing demands and challenges.

The central theme of IASDR 2023, "Life-Changing Design", resonates profoundly in the wake of global events, particularly the unprecedented disruptions caused by the COVID-19 pandemic. This theme invites us to reflect on the profound transformations that have unfolded and continue to reshape our world. The pandemic has brought to the forefront questions about the role of design in navigating these changes, challenging us to explore how design can facilitate adaptation, resilience, and innovation in a rapidly changing world.

IASDR 2023 has been organised and host by Politecnico di Milano, where design keeps strong roots in the made in Italy tradition and where at the same time design opens up to the new territories of design research and to the new trajectories of innovation.

IASDR 2023 encompasses an array of thematic tracks, each dedicated to exploring critical dimensions of design research. These tracks serve as focal points for discussions and investigations, providing a framework for researchers to delve into specific areas of interest.

The following thematic tracks guide our exploration:

[Changing] Organizations and Policies

This track examines the transformative potential of design in the realm of public sector organisations and policies. It aims to foster social justice and sustainability by challenging traditional notions of prosperity. Researchers investigate how design equips itself with tools, methods, and frameworks to support systemic transformation, thereby promoting well-being and addressing complex societal challenges.

[Changing] Products and Production

This track focuses on the transformation of manufacturing processes and their impact on products and

systems. It explores the proliferation of digital fabrication and digital craft, analysing their potential to revolutionise product development, sustainability, and business models. Researchers delve into how design can envision emerging materials, artefacts, and future scenarios from a sustainable perspective.

Identities and [Changing] Identities

Cultural identities and their evolution in an increasingly multicultural world take center stage in this track. Researchers delve into the roots of design's influence on identity, considering factors such as authorial identities, identity hegemony, and the implications of design on gender, class, and religion. Additionally, this track explores the role of design in translation processes, which involve revising systems, tools, and programs for communicating and preserving identity.

[Changing] Ecosystems

Addressing the imperative transition toward sustainability, this track examines how design contributes to the socio-ethical and economic dimensions of sustainability. It explores design for sustainable materials, energy, business models, and transitions, focusing on fostering positive environmental and social change.

[Changing] Communities

Community empowerment and sustainable behavioural change through design interventions are central to this track. Researchers investigate how design can enhance collaborative processes, co-design knowledge, and tools while addressing urgent public interest issues. The track emphasises shared decision-making, democratic participation, and the evolving roles of individuals, communities, and entities in supporting systemic transitions.

[Changing] Education

This track reflects on the evolving landscape of design education, recognising the complexities and challenges inherent in this domain. Researchers explore the inspirations for change in design education, the transformations it engenders, and the existing gaps and issues. This track seeks to foster clarity, identity, and adaptability in designing educational goals while embracing diversity and differentiation.

[Changing] Spaces and Services

Integrating spatial and service design to create innovative living environments and services is the central concern of this track. It explores how design interventions across various scales, from micro to macro, can drive transformative actions, enhance public participation, and guarantee inclusivity and diversity in service offerings.

[Changing] Interactions

The dynamic interplay between technology, social changes, and design forms the core of this track. Researchers investigate how digital technologies, augmented reality, virtual reality, and mixed environments impact interactions, communities, processes, and professions. This track emphasises the role of Interaction Design in shaping technology-based innovations responsive to social and contextual changes.

[Changing] Heritage

Preserving and reinterpreting cultural heritage in the face of global change is the central focus of this track. Researchers explore how design research can offer novel approaches to knowledge preservation and cultural experiences related to tangible and intangible heritage. This track seeks to activate participation dynamics that reintegrate relevant portions of cultural heritage excluded from current development paradigms.

IASDR 2023, with its overarching theme of "Life-Changing Design" and its diverse thematic tracks, presents an exceptional opportunity for researchers, scholars, and practitioners to engage with the dynamic landscape of design research. The conference serves as a platform for robust discussions, knowledge sharing, and the exploration of innovative solutions to society's complex challenges.

By examining these thematic tracks and their intersection with the central theme, “Life-Changing Design,” we aim to contribute to the ongoing dialogue surrounding design research and its transformative potential, fostering a deeper understanding of design’s role in shaping our world.

Luisa Collina
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Pictorials in Design Research. A Comprehensive Analysis of IASDR 2023 Contributions

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In the context of scholarly publication, Pictorials represent a valuable approach to knowledge dissemination, particularly in design, HCI, and related disciplines. These academic contributions elevate visual elements to central roles in scholarly communication, facilitating a holistic understanding of research findings. They provide a setting where visual elements, including diagrams, sketches, photographs, and illustrations, take center stage, fostering innovative ways of communicating research. They also offer an alternative framework for sharing complex concepts that resist traditional textual transcription. This shift acknowledges the cognitive significance of visual representations and the limitations of text-centric formats. In this contribution we analyze Pictorials submitted to IASDR 2023 in terms of recurring themes, visual elements, relationship between visuals and text, communication functions, narrative structure, and visual quality. We find a wide variety of approaches, with some achieving seamless integration while others remain somewhat disjointed. Common composition strategies include annotated images, text-rich diagrams, and captions. Narrative structures within Pictorials include sequences of images, storyboards, juxtapositions, and complex formats, each serving unique purposes in conveying research findings. The analysis culminates in the development of a set of comprehensive categories, which discerningly classifies Pictorials into distinct typologies: information-driven, narrative-driven, informative, and technical or scientific, reflecting diverse design and communication goals. In conclusion, Pictorials celebrate diversity in expression and the integration of visual and textual communication, transforming how knowledge is shared.

Keywords: pictorial; knowledge dissemination; visual design; scholarly publications



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1 Introduction

1.1 A working definition

In the context of scholarly publishing, particularly in the fields of design, HCI, and related disciplines, the term Pictorials typically refers to a category of scholarly work in which visual elements play a central role in the communication of scholarly contributions (*Papers and Pictorials, DIS2022*; Pictorials, TEI 2021; *Pictorials, Creativity & Cognition 2021*). In this visually rich format, various forms of visual elements such as field notes, photographs, sketches, diagrams, screenshots, illustrations, renderings, and artistic creations play a role that is as important (if not more) than the text that accompanies them, allowing for a variety of different perspectives. Pictorials, in other words, offer an alternative framework for knowledge dissemination that harnesses the expressive potential of visual means to communicate concepts that may not be well suited to more traditional textual transcription. By offering a medium in which images are not mere supplements but central components of intellectual discourse, Pictorials encourage a broader and more engaging approach to knowledge sharing, providing design and related disciplines with a scholarly format that encourages an innovative use of visual communication to redefine the contours of knowledge transmission within the design research landscape (Blevis et al., 2015).

In some ways, Pictorials represent a reclamation of the visual within the academic fabric: they provide a communicative tool that allows for the sharing of potentially complex design research findings, merging intellectual rigor with a sensory experience, and providing a richer set of communication tools for researchers who wish to share concepts, contexts, or experiences that are deeply rooted in visual practices. The gradual rise of Pictorials to the same level as full papers in terms of production standards, review procedures, and academic relevance marks a transition to more innovative ways of communicating research and a progressive departure from conventional norms, opening doors to a variety of expressive formats to foster a richer understanding of scholarly contributions.

1.2 Visual Communication in Scholarly Publishing

In the history of scientific thought and academic discourse, the heritage of visual communication is well documented. Images have historically been employed to articulate complex scientific principles, to document empirical observations, and to explore, study, and communicate complex ideas, with examples ranging from the meticulously illustrated manuscripts of the Middle Ages to the anatomical drawings of the Renaissance (Ford, 1993). The human cognitive system, with its roots in sensory experience, relies as much on visual representation as it does on logical, analytical thought, and research has explored the influence of various forms of visual thinking on distinct aspects of learning (Berry and Chew, 2008; Dexter and Hughes, 2011; Nesbit and Adesope, 2006) and the role of visual thinking processes in supporting information communication (Chabris and Kosslyn, 2005; Tufte, 2006).

However, while the practice of scientific research is heavily influenced by visual tools and methods, conventional academic publishing has predominantly employed text-centric formats, prioritizing textual expression over the use of visual elements, which are often relegated to a subordinate role (Jessica Barness & Amy Papaelias, 2021).

Traditional scientific publications, while invaluable to the advancement of knowledge, face the inherent self-imposed limitations associated with their primary reliance on linear text as a

communication medium (Chiriboga, 2019). This is particularly true in fields such as design, human-computer interaction (HCI), and related areas, where the complex interplay of interactive interfaces, the subtle aspects of user experience, and the physical manifestations of design processes can be difficult to fully explain through writing alone (Cross, 2003).

Scholarly communication has, however, undergone a significant transformation in the digital age. In the countless changes brought about by this shift, written communication is gradually loosening its hegemony, and an environment ripe for the re-evaluation of alternative formats is emerging. In this landscape, the potential of images has regained prominence, particularly in fields that prioritize experiential and aesthetic aspects as central components of their research paradigms, especially in the field of design research.

In this context, visual communication occupies a unique position at the intersection of creativity and information exchange with a dualistic nature: on the one hand, visuals possess an eloquence that transcends linguistic barriers, enabling them to evoke emotions, encapsulate sensory experiences, and convey nuances that often elude textual articulation. On the other hand, in the context of scholarly discourse, images require deliberate curation, as the intrinsic eloquence of visual representation must be carefully balanced against the need for precision and coherence. Visual representation emerges as an interpretive act that not only requires attention to the representative dimension, but also a nuanced understanding of the intricacies of the subject matter .

In this modern environment, Pictorials present themselves not only as a categorical distinction, but rather as a profound reimagining of the scholar's expressive tools, where a convergence of historical antecedents, digital innovations, and the intrinsic capacity of images to communicate complex phenomena has led to an intellectual context in which the visual is accorded new scholarly significance. In this vein, Pictorials represent both a revival and an evolution: they reflect the potential for visuals to enrich academic discourse, while also calling for a reconfiguration of our understanding of scholarly representation in the digital age.

By highlighting visual elements such as field notes, sketches, diagrams, and screenshots, pictorials act as a bridge, creating a dynamic space that reframes the distinct advantages of both visual communication and academic dissemination. Positioned at the intersection of media theory, design studies, and academic publishing, pictorials reflect a change in the manner in which knowledge is not solely conveyed, but also encountered.

By emphasizing the visual, Pictorials engage with an alternative epistemology that recognizes the power of images to elicit emotions, evoke contexts, and convey intricate narratives that may exceed traditional textual articulation. The field of Design, which emphasizes the sensory experience, recognizes the need for new methods of communication able to provide a unique way to express the embodiment aspect of design knowledge, communicating the implicit knowledge inherent to the design process, thereby fostering a deeper comprehension of the subject matter.

1.3 Objectives

Given this context, in this paper, we analyze the range of images presented at IASDR 2023, with the goal of developing a deeper understanding of the current use of such a communication format, its potential, and its limitations. In this study, our aim is to examine how authors leverage the creative

flexibility afforded by the pictorial format to communicate their research findings, and to analyze the ways in which authors use this visual medium to enhance the communication of scientific knowledge.

The aim is to assess the prevalence and importance of different visual elements (diagrams, infographics, illustrations, photographs, etc.), their relation to the textual content, and their overall narrative. Through this analysis, we hope to gain a better understanding of the relationship between the nature and content of scientific papers and the visual structures used to convey them. Additionally, we will attempt to establish whether different visual logics emerge within the realm of academic pictorials and, if so, whether they bear any intrinsic relationship to the content of the papers. Lastly, we will attempt to discuss some of the limitations observed in pictorial submissions and engage in a reflective discussion of the underlying reasons that contribute to these limitations. By critically examining the challenges and constraints authors face in effectively utilizing visual elements, we hope to shed light on potential areas for improvement in the guidelines provided by scholarly publishing platforms.

Through these objectives, we aim to make a focused contribution to the ongoing discourse related to the role of visuals in academic communication and to provide insights into the evolving landscape of scholarly publishing.

2 Methodology

In order to explore patterns and typologies used in design research in the context of pictorials, this paper uses a mixed-methods approach to analyze a dataset consisting of all pictorials submitted to IASDR 23. The methodology includes five key dimensions, each of which aims to provide a different perspective on the use of pictorials.

- **Visual elements:** This dimension involves the categorization of the various visual components present in the pictorials. The goal is to identify the prevalence and importance of various visual aids, such as diagrams, photographs, screenshots, and more. This categorization facilitates the identification of trends in the selection and use of visual representations in the context of design and research presentations.
- **Relationship to Text:** Within this dimension, we explore the intricate relationship between visuals and textual content. The analysis seeks to determine the extent to which visuals complement or augment textual information, and whether they play a primary or secondary role in conveying the intended message. By exploring this dimension, we gain insight into how designers and researchers balance the integration of text and visuals to effectively communicate their ideas.
- **Communication function:** Within this dimension, we focus on identifying communication objectives. The analysis seeks to identify the core purposes served by the visuals within the presentation: whether the visuals are primarily used to illustrate concepts, showcase prototypes, illustrate research tools, or achieve other communication goals, this analysis reveals the primary functions of the visuals and their contribution to communicating complex design and research concepts.

- **Narrative Structure:** This dimension examines how visuals work with textual elements to construct the overall narrative of the presentation. It assesses whether visuals are used sequentially to depict temporal progressions or stories, or whether they are used in fragmented ways, such as juxtapositions for comparative purposes or as collections of detailed examples. Analyzing narrative structure reveals how visuals are woven into the storytelling process.
- **Graphic Quality:** This dimension aims to assess the overall craftsmanship of graphic elements, including images, charts, graphs, and illustrations. By examining graphic quality, we seek to determine the level of clarity, detail, and professionalism demonstrated in these visuals. This analysis helps to identify potential improvements in the graphical presentation of research findings or design concepts.

By examining the data along these dimensions and correlating it with the analysis of the topics discussed in the papers, we can gain meaningful insights into prevalent approaches, emerging trends, and variations in the visual communication strategies employed by designers and researchers. These learnings allow for a deeper understanding of evolving practices and preferences in the field, thereby fostering a better comprehension of the crucial role of visuals in the communication of design and research concepts. Furthermore, this research helps to inform the development of best practices for effective visual communication in both academic and professional contexts, ultimately enhancing the quality and impact of visual presentations at conferences such as IASDR.

Although the potentials of this analysis are exciting, we acknowledge the potential limitations of qualitative interpretation and the complexity of integrating heterogeneous data. As a result, we recommend that these findings be interpreted as an initial exploration of a limited sample of contributions, which nevertheless holds the potential to enrich our understanding of the field.

3 Results

3.1 Recurring topics

Analysing specific themes and keywords frequently used within the contributions, the potential for change and transformation that is inherent in contemporary design processes emerges. Eliminating the word design used as a single and separate word, concepts such as prototyping, speculative design, interaction design and community involvement continue to prove the central role that design and design practices play in reshaping social paradigms, human interactions and the structures of our living environments.

Considering the Pictorials track as an opportunity to visually display and argue research reflections, processes and solutions, the recurring presence of the word prototyping underlines the ability of design methods to manifest abstract ideas into tangible solutions. The Pictorial form was effectively applied in most contributions to visualise and explicate research models in diagrams and schemes or to display results in figures, renderings, mock-ups or photographs (Fernández-Fontecha et al., 2019).

Through the approach of speculative design (Dunne & Raby, 2013) this analysis is identified as a collection of contributions that stimulate critical reflection and dialogue on pressing issues through

emotional and cognitive visualisations, fostering user empathy and facilitates the understanding of written contents (Hegarty et al., 1991).

The nature of the interaction design discipline, rooted in the principles of user-centredness, also sees the visual dimension as fundamental for the argumentation of its design process (Dahl et al. 2001). Both user research and the various forms of visualising user paths, to the point of designing and prototyping interfaces, were the subject of the manifold contributions that leverages this specific format to allow greater level of detail and comprehension.

Finally, the recurring theme of community involvement underlines the central role of design in promoting participatory and inclusive research activities. Design can go beyond the mere transactional nature of finished objects and spaces, extending into shared experiences and participatory development processes. In this perspective, it becomes an agent of social transformation. Applying participatory design, the contributions show how the collective design and use of notational toolkits and systems useful for field research can increase the users' sense of belonging with the final outcome of collaborative investigation.

From a scientific point of view, these recurring themes and keywords collectively underline the evolving landscape of research through design (Frayling, 1993), emphasising its interdisciplinary nature, its strength in considering ethics and suggest the impact it may have on society. It is also evident how certain themes related to the visualisation of processes and outcomes are particularly suited to the communicative form of Pictorial. They encourage the authors to adopt the storytelling potential that this format allows more intensely in the future.

3.2 Visual elements

A rich variety of visual elements, skillfully woven into complex visual structures, is evident in the pictorial publications analyzed. Rarely confined to a single typology, such publications frequently employ a seamless blend of three to four different visual components. This deliberate combination of elements, including photographs, diagrams, illustrations, and charts, not only enhances the overall visual appeal, but also facilitates a more nuanced and comprehensive transmission of information. It highlights a deliberate effort to engage and inform audiences through well-rounded and visually rich presentations that extend beyond the limitations of a single visual format.

Some of the most common visual elements in the submissions under review are:

- **Photos of prototypes:** These are photographs of physical or digital prototypes of a product or design. They are used to show the physical representation of an idea or concept.
- **Diagrams:** Diagrams are visual representations that use symbols, shapes, and lines to convey information or relationships between elements. They are often used to simplify a complex concept or process.
- **Illustrations:** Illustrations are hand-drawn or digitally generated images that provide a representation of concepts, ideas, or objects related to the project.
- **Photos of scenarios:** Scenario photos depict real-life situations or scenarios relevant to the project. For example, if the author is presenting a kitchen appliance, photos of it in a kitchen would be scenario photos.

- **3D Renders:** These are computer-generated images that represent three-dimensional objects or scenes. They are often used in product design and architectural presentations.
- **Process photos:** These photos document various stages of the design or research process. They can include images of team members at work, materials being used, or equipment being set up.
- **Reference Images:** Reference images are visuals used for inspiration or as a point of reference in the design or research process. They can include images of similar products, styles, or historical references.
- **Screenshots:** Screenshots are images of computer screens or digital interfaces. They are valuable for showing software interfaces, web designs, or other digital aspects of a project.
- **Charts:** Charts are graphical representations of data or statistics. They help present quantitative information in a visual and easy-to-understand format. They can include bar charts, histograms, graphs, time lines, etc.
- **Notes/Sketches:** These are images of handwritten or digital notes and sketches related to the project. They can include brainstorming sessions, rough ideas, or preliminary drawings.
- **Maps:** Maps are graphical representations of geographic locations or spatial data. They can be used to show geographic aspects relevant to the project, such as location-based research or design considerations.

3.3 Relationship with text

The analysis of pictorial publications reveals a variety of approaches to establishing connections between visual elements and textual content. While the strategies for this integration are varied and functional, it is noteworthy that in most cases the primary text and accompanying visual components appear somewhat disjointed, except for their relative placement within the publication. Only in exceptional cases do we encounter examples where the images and text are deeply interwoven.

Among the relationships identified between textual and visual components, some of the most common include:

- **Annotated photos:** Annotated photos are images with text annotations or labels added to provide additional context, explanation, or information about specific elements within the image.
- **Annotated Diagrams:** Annotated diagrams are visual representations that include explanatory text or labels to help the audience understand the components or concepts depicted in the diagram.
- **Text-rich diagrams:** Text-rich diagrams are visual representations that rely heavily on textual elements to convey information or concepts. These diagrams may include detailed labels, descriptions, or explanations within the visual.

- **Captions:** Captions are short, descriptive pieces of text typically placed below or next to images to provide context, explanation, or additional information related to the image content.
- **Complex image-text composites:** Complex image-text composites are combinations of text and images that work together to convey complex or detailed information, such as cards or tables. These compositions often require the audience to interpret both text and images to fully understand the message.
- **Fully integrated visual elements:** Fully integrated visual elements refer to the seamless blending of images, charts, or other visual elements with the written content of the image to create a single, cohesive presentation.

3.4 Communicative functions

Visual elements in the analyzed publications cover a wide range of communicative functions. Their versatility allows them to serve different purposes, from explaining the structure and function of objects to explaining complex design processes and concepts. They can showcase prototypes, highlight design results, or even function as primary results themselves in fields such as visual and communication design.

Among the communicative functions identified, the most important are:

- **Explaining the structure/function of an object:** In this context, visuals are used to convey information about the structure and function of an object, product, or system. They may include diagrams, schematics, or illustrations that provide a clear understanding of how the object works or is organized.
- **Explain the design process:** Visuals can be used to walk the audience through the design process, showing the various steps and decisions made during the creation of a product or system. This could include flowcharts, timelines, or process diagrams.
- **Explain the concept:** Visuals used to explain concepts aim to make abstract ideas or theories more tangible and understandable. These visuals can include metaphors, analogies, or graphical representations to simplify complex concepts.
- **Showing the prototype:** Visuals are used to present physical or digital prototypes of a product or design. This allows the audience to see a tangible representation of the intended final product, even if it's not fully developed.
- **Explaining design results:** Design results explanation visuals show the results of a particular design project. This could include data visualizations, graphs, or before-and-after comparisons to show the impact of the design.
- **Showing Interactions:** Visuals can be used to demonstrate how different elements interact with each other within a system or design. This might involve animations, simulations, or user interface mockups to illustrate user interactions.

- **Explaining Methodology:** Visuals can be used to clarify the research or design methodology employed in a project. This could include flowcharts, diagrams, or infographics that outline the steps taken in the research or design process.
- **Explaining Research Tools:** Visuals used for explaining research tools provide insights into the tools, instruments, or software used in a research or design project. This helps the audience understand the technology or resources behind the work.

In addition to these functions, in the case of contributions related to fields such as visual communication or interface design, the visuals may be themselves intended as the outcome or primary results of a project, and not a mere representation of the results. This may include studies of visual languages, visual depictions, notational systems, and so on.

3.5 Narrative structure

With respect to the images submitted, visual presentations not only use a variety of visual elements, but also construct visual narratives by combining and arranging them in ways effectively able to convey the research contents. These diverse visual elements convey sequential narratives through temporal progressions or storyboards; they create juxtapositions for comparative purposes; they adapt complex and unique formats such as screenplays or maps; or serve as collections of individual images to highlight details, features, or examples, all skillfully woven into the storytelling process.

The following narrative structures emerge in the analyzed entries:

- **Sequences of images (temporal development):** In this narrative structure, visuals are used in sequence to depict a temporal progression. This means that the visuals are arranged to show a chronological order of events or changes over time. This can be particularly useful for presentations or storytelling that involve historical timelines, processes, or any subject matter that unfolds over a period of time.
- **Storyboards:** This narrative structure involves using visuals in a sequence to create a story or narrative arc. Often accompanied by textual contents, or annotations, each visual represents a specific moment or frame in the story.
- **Juxtaposition of images:** In this structure, visuals are placed next to each other or in close proximity for comparison purposes. The juxtaposition allows the audience to draw connections or contrasts between the visuals. This can be used to highlight differences, similarities, or relationships between different elements within the presentation.
- **Complex formats:** Visuals are structured in complex combinations of textual and visual elements, organized in specific formats such as cards, scripts, diagrams, forms, etc.
- **Collection of images:** Visuals are grouped together to provide a comprehensive view of specific details, features, or examples related to the topic.

3.6 Emerging typologies

From the evaluation of the selected criteria, recurrences of values emerge in the context of pictorials that seem to identify some proto-typological forms of communication that display a consistency in the utilization of visual elements, visual structure, and communicative functions, highlighting a tendency

of certain visual representations to align with specific characteristics and intended purposes. However, while this emergence is fairly consistent, it is crucial to emphasize that these categories are not rigidly demarcated from one another and instead, they exhibit a notable fluidity, with elements of overlap and interplay. This fluidity underscores the dynamic nature of visual communication, where boundaries between categories are permeable, and the potential for creative synthesis and reinterpretation is apparent. In light of this analysis, we can identify five main typological forms, each displaying its own unique characteristics and functions:

Information-Driven Pictorials

These pictorials prioritize the effective communication of data and information. They excel in aspects such as graph quality, visual hierarchy, and readability of information.

Recurring visual elements: Charts, Diagrams, Screenshots

Recurring relationships with text: Annotated Diagrams, Text-rich diagrams

Recurring communicative functions: Explaining the structure/function, Explaining the design process

Recurring narrative structures: Sequences of images, Complex formats

Narrative Pictorials

Narrative-driven pictorials emphasize visual storytelling. They are strong in composition, visual and content relationship, and creating a coherent narrative flow.

Recurring Visual elements: Photos of scenarios, Illustrations, Storyboards

Recurring Relationship with text: Complex image-text composites, Fully integrated visual elements

Recurring Communicative functions: Showing the prototype, Showing Interactions

Recurring Narrative structure: Sequences of images, Storyboards, Juxtaposition of images

Informative Pictorials

Informative pictorials are geared toward presenting information for enhancing understanding. They employ visual elements that eliminate ambiguity and enhance comprehension.

Recurring Visual elements: Diagrams, Charts, Notes/Sketches

Recurring Relationship with text: Annotated photos, Annotated Diagrams, Captions

Recurring Communicative functions: Explain the design process, Explaining design results, Explaining Methodology

Recurring Narrative structure: Complex formats, Collection of images

Technical or Scientific Pictorials

Pictorials in this category focus on maintaining graphical integrity and accuracy. They are characterized by high-quality graphs, charts, and diagrams and are commonly found in scientific publications.

Recurring Visual elements: Charts, Diagrams, Reference Images

Recurring Relationship with text: Captions

Recurring Communicative functions: Explaining the structure/function of an object

Recurring Narrative structure: Complex formats

While it's clear that each category is characterized by its own affinities for visual elements, visual structures, and communicative functions, the boundaries between specific categories are exceptionally blurred, and we celebrate this fluidity as a sign of the dynamic nature of visual

storytelling and the adaptability of designers and communicators in using different elements to effectively convey their messages. Ultimately, while typologies provide useful frameworks, they should not suppress the innovation that can emerge from a design's intersections and overlaps.

4 Conclusions

In the field of design research, the integration of textual visual elements is fundamental to the communication of complex ideas and findings. This paper has undertaken a comprehensive analysis of pictorial submissions across five parameters: the nature of visual elements, their relationship to textual content, communicative functions, narrative structures and visual quality. While the overall quality of the submissions is high and demonstrates a very good control of the medium, it may be useful to discuss some limitations.

First, the quality of visual elements is a key concern. Authors are often limited by a lack of access to high-quality equipment or expertise in creating professional-quality visuals. This can result in visuals that do not effectively convey the intended message, limiting their communicative potential.

Accessibility and inclusivity are additional dimensions of limitation. Image submissions can inadvertently exclude readers with disabilities if visuals are not designed with accessibility in mind. Addressing this limitation requires increased awareness of accessibility requirements and tools.

Interpretation and clarity are important aspects to consider when submitting visuals, so authors must strive for clarity in the design of their visuals and provide clear guidance to the reader. While visuals provide a rich communication channel, they may also have issues in conveying the intended message or may be susceptible to multiple interpretations, potentially leading to confusion among readers.

A well-executed pictorial goes beyond simply increasing the number of images in a research paper; it focuses on achieving a seamless integration of visualizations and text. This integration aims for a holistic approach, where visual elements and textual content complement and enhance each other. The result is a more comprehensive and synergistic presentation of the research findings, ensuring that both visuals and text work together to convey a deeper and richer understanding of the subject matter.

4.1 Recommendations for designing Pictorials

In the context of IASDR 23, the intent behind the Pictorial call was to foster innovation and diverse perspectives at the intersection of visual communication and knowledge dissemination. While a word template for the pictorial track was thoughtfully provided, authors were accorded the freedom to exercise their creativity in developing the visual style and storytelling of their contributions. In line with the scope of the IASDR conference, the track encouraged the presentation of multifaceted research findings as well as reflection on the dynamic and evolving nature of visual communication within the scientific community. Based on an exhaustive examination of the limited literature available on the subject of pictorials and neighbouring body of knowledge on visual communication, in conjunction with the results obtained, we have synthesised a minimal set of recommendations that can be useful to researchers willing to experiment with visual communication formats.

Content development

- Content structure: focus on organising content logically, using visual components to enhance the flow of ideas.
- Visual-content relation: ensure coherence and alignment between visual elements and textual content for a seamless integration that reinforces understanding.

Composition structure

- Thoughtful composition: prioritise the arrangement and organisation of visual elements for a visually pleasing and coherent presentation.
- Visual hierarchy: create a clear hierarchy to communicate importance and relationships effectively.
- Visual consistency: maintain a consistent design language aligned with your research paper's aesthetic.

Visual design

- Strategic use of colour and contrast: employ colours and contrast effectively to highlight important information.
- Selected typography: choose fonts, sizes, and styles that enhance text readability and complement visual elements.
- Scale and proportion: maintain appropriate sizes and proportional relationships among visual elements.
- Effective use of symbols and icons: use symbols and icons judiciously to convey meaning and simplify complex information.
- Graphical integrity: maintain the accuracy and credibility of graphical representations, such as graphs, charts, and diagrams.

Overall, these clusters provide a structured approach for authors and designers to consider various aspects of pictorial design and composition, ensuring that visual and textual elements work harmoniously to effectively convey research findings.

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