

jacques bertin semiology of graphics

Jacques Bertin Semiology of Graphics: Unlocking the Language of Visual Information

jacques bertin semiology of graphics is a cornerstone concept in the world of data visualization and graphic representation. It refers to the systematic study and theory of how graphical elements convey meaning, developed by Jacques Bertin, a pioneering French cartographer and theorist. His work laid the foundation for understanding how visual variables can be manipulated to encode and communicate complex information effectively. Whether you're a designer, data analyst, or just someone curious about how visuals speak to us, exploring Bertin's semiology offers invaluable insights into the language of graphics.

Understanding Jacques Bertin and His Semiology of Graphics

Jacques Bertin emerged in the mid-20th century with a revolutionary idea: graphics are not just decorative tools but a language with its own grammar and syntax. His seminal book, *Semiology of Graphics* (originally published in 1967 as *Sémiologie Graphique*), remains a fundamental text that dissects how visual variables function as a system to represent data.

Bertin's semiology is essentially about decoding the "grammar" of graphics – how shapes, colors, sizes, and positions can be systematically used to represent different types of information. This approach transformed how we think about charts, maps, and diagrams, emphasizing clarity, precision, and cognitive effectiveness.

The Core Principles of Bertin's Semiology

At the heart of Jacques Bertin's theory are visual variables, which are fundamental building blocks for creating meaningful graphics. These variables include:

- **Position:** Where an element is placed on a plane
- **Size:** The magnitude of a graphic element
- **Shape:** The form or contour of the element
- **Value (Lightness):** The lightness or darkness of the element

- **Color (Hue):** The color or tone of the element
- **Orientation:** The direction an element faces
- **Texture:** The pattern or granularity within the element

Each of these variables can be manipulated independently or in combination to encode different types of data, making them highly versatile in graphic design and data visualization.

How Jacques Bertin's Semiology Influences Modern Data Visualization

In today's world, where data is abundant and visual communication is crucial, the principles established by Jacques Bertin's semiology of graphics are more relevant than ever. Data scientists, infographic designers, and mapmakers use these visual variables to craft visuals that are not only attractive but also intuitively understandable.

Facilitating Cognitive Processing

One of the key contributions of Bertin's work is its focus on how the human brain processes visual information. By carefully selecting and combining visual variables, designers can minimize cognitive load and enhance the viewer's ability to interpret data quickly and accurately. For example, using position and size to represent numerical data often results in more precise comparisons than relying solely on color differences.

Guiding Effective Chart and Map Design

Jacques Bertin's semiology provides a blueprint for creating effective charts and maps. Cartographers, for instance, use position and shape to accurately place geographical features, while color and texture can indicate thematic data such as population density or vegetation types. Similarly, in business dashboards, size and value may represent sales volumes or trends, making complex data sets accessible at a glance.

Practical Applications of Jacques Bertin

Semiology of Graphics

Understanding and applying Bertin's visual variables can transform how you communicate data in various fields. Let's explore some practical ways his semiology informs graphic design and information representation.

Designing Clear and Insightful Infographics

Infographics thrive on clarity and storytelling. By leveraging Bertin's principles, designers can thoughtfully choose which visual variables to apply for different data types—using shape to differentiate categories, color to encode qualitative differences, and size to represent quantitative distinctions. This deliberate approach avoids clutter and ambiguity, making infographics powerful tools for engagement.

Improving User Interfaces and Data Dashboards

In user experience (UX) design, especially for dashboards that display complex datasets, applying Bertin's semiology helps prioritize information and reduce confusion. For instance, varying the orientation or texture of icons can signal different statuses or priorities, while consistent use of color palettes supports quick pattern recognition.

Enhancing Scientific and Educational Visuals

Scientists and educators rely on visuals to explain concepts and present research findings. Following Bertin's framework ensures that graphics are not only accurate but also pedagogically effective. For example, using contrasting values of lightness to depict intensity or frequency can make charts more accessible to diverse audiences.

Why Jacques Bertin's Semiology of Graphics Still Matters Today

Despite the surge of digital tools and automated chart generators, the foundational ideas of Jacques Bertin remain crucial. Automation can produce charts quickly, but understanding the semiology behind graphics enables creators to make informed choices that truly enhance comprehension and storytelling.

Moreover, as data becomes increasingly complex, the need for a structured

approach to visual encoding is essential. Bertin's work encourages us to think of graphics not just as art or decoration but as a precise language—one that when mastered, can reveal insights hidden within data.

Tips for Applying Bertin's Principles in Your Visual Work

- **Start with the data type:** Identify whether your data is quantitative, qualitative, or relational to choose appropriate visual variables.
- **Use position wisely:** It's one of the most accurate visual variables for representing information, so prioritize it where precision matters.
- **Limit the number of variables:** Too many visual variables can overwhelm the viewer; keep it simple for clarity.
- **Maintain consistency:** Use visual variables consistently across your visualization to avoid confusion.
- **Test your graphics:** Gather feedback to ensure your use of semiotic elements communicates the intended message.

Embracing these tips rooted in Jacques Bertin's semiology can elevate your ability to communicate visually and make your graphics more meaningful.

Exploring Jacques Bertin's semiology of graphics opens a window into the rich interplay between data and design, reminding us that every visual element carries meaning. By mastering this language, we can craft visuals that not only inform but also inspire and engage.

Frequently Asked Questions

What is Jacques Bertin's 'Semiology of Graphics' about?

Jacques Bertin's 'Semiology of Graphics' is a seminal work that explores the theory and practice of visualizing information through graphic representations. It outlines how visual variables like size, shape, and color can be systematically used to convey data effectively.

Who was Jacques Bertin and why is he important in

data visualization?

Jacques Bertin was a French cartographer and theorist known for pioneering the field of information visualization. His work, particularly 'Semiology of Graphics,' laid the foundational principles for designing clear and meaningful graphical representations of data.

What are the main visual variables identified by Bertin in 'Semiology of Graphics'?

Bertin identified seven key visual variables: position, size, shape, value (lightness), color (hue), orientation, and texture. These variables are used to encode information in graphics and help viewers interpret data effectively.

How does 'Semiology of Graphics' influence modern data visualization techniques?

'Semiology of Graphics' provides a theoretical framework for mapping data attributes to visual variables, influencing modern visualization tools and techniques. Its principles guide the design of charts, maps, and infographics to improve clarity and comprehension.

Can you explain the concept of 'retinal variables' as introduced by Bertin?

'Retinal variables' refer to the visual properties such as size, shape, color, and texture that can be manipulated in graphical elements to represent different data dimensions. Bertin emphasized their role in encoding information visually to facilitate data analysis.

How does Bertin's work address the challenge of representing multivariate data?

Bertin's framework allows multiple visual variables to be combined in a single graphic, enabling the representation of several data dimensions simultaneously. By carefully selecting and varying retinal variables, complex multivariate data can be conveyed clearly.

What is the relevance of 'Semiology of Graphics' in the age of digital data visualization?

Despite being published in 1967, 'Semiology of Graphics' remains highly relevant as it provides foundational principles for effective visual communication. Its emphasis on the systematic use of visual variables informs the design of digital dashboards, interactive graphics, and data-driven storytelling today.

Additional Resources

****Jacques Bertin Semiology of Graphics: Decoding the Language of Visual Communication****

jacques bertin semiology of graphics represents a foundational framework in the study of visual communication and information design. Originating in the mid-20th century, Bertin's pioneering work transformed how data visualization is understood and applied across disciplines from cartography to modern data analytics. His seminal book, **Sémiologie Graphique**, published in 1967, systematically dissects the visual variables that compose graphics, creating a lexicon for interpreting and crafting meaningful visual representations of data.

The Essence of Jacques Bertin Semiology of Graphics

At its core, Jacques Bertin's semiology of graphics is the study of the "grammar" and "syntax" of visual elements used to convey information. Bertin proposed that graphics function much like language—built from basic visual signs that interact to communicate complex ideas effectively. This innovative perspective elevated the role of design in data visualization beyond mere aesthetics, emphasizing clarity, accuracy, and efficiency in information transmission.

Bertin's framework identifies and categorizes visual variables such as position, size, shape, value (lightness), color, orientation, and texture. These variables serve as the fundamental building blocks for constructing visual messages. By manipulating these elements, graphic designers and data analysts can highlight relationships, differentiate categories, or reveal patterns within datasets. This systematic approach to graphical semiotics remains influential in contemporary fields like information design, UX/UI design, and geographic information systems (GIS).

<h2>In-depth Analysis of Bertin's Visual Variables</h2>

Jacques Bertin's classification of visual variables is one of the most critical contributions to semiology of graphics. Each variable has a unique role and degree of effectiveness depending on the type of data being represented.

<h3>Position</h3>

Position is arguably the most powerful visual variable. Bertin argued that spatial location on a plane can convey quantitative or qualitative distinctions with high precision. For example, in scatter plots or maps, the position of points directly encodes data values or geographic locations. Position's strength lies in its ability to represent continuous variables

accurately, making it indispensable for quantitative analysis.

<h3>Size</h3>

Size variation can depict magnitude or quantity effectively. Larger symbols generally indicate greater values, while smaller ones represent lesser amounts. However, Bertin cautioned against over-reliance on size due to possible perceptual distortions—such as the difficulty in judging area compared to length—which can mislead interpretation.

<h3>Shape</h3>

Shape is primarily suited for categorization and differentiation rather than quantitative measurement. Different shapes can distinguish between groups or types within data, such as various markers on a map or symbols in a legend. However, shapes need to be distinct and recognizable to avoid confusion.

<h3>Value (Lightness)</h3>

Value refers to the lightness or darkness of an element and is effective for showing gradations or intensity. For instance, shading on a topographic map uses value to indicate elevation changes. Its subtlety can be advantageous but may pose challenges for viewers with visual impairments.

<h3>Color</h3>

Color is a versatile visual variable capable of encoding both qualitative and quantitative information. Bertin highlighted color's ability to draw attention and convey meaning but also warned against excessive or inappropriate use, which can lead to ambiguity or visual clutter. Color choice must consider cultural connotations and accessibility.

<h3>Orientation</h3>

Orientation, the direction of an element, can signify differentiation among categories or processes. For example, varying the angle of lines or glyphs can imply distinct types of movement or flow. However, orientation's effectiveness depends on a clear visual context.

<h3>Texture</h3>

Texture or patterning is useful for filling areas to indicate categories or intensity levels. It is often employed in thematic maps to distinguish regions without relying on color, which can be beneficial for grayscale reproduction or color-blind users.

<h2>Applications and Impact of Bertin's Semiology of Graphics</h2>

Jacques Bertin's semiology of graphics has had a profound and lasting impact on multiple fields. Its principles have guided the development of modern data visualization tools, cartography, and graphic design.

<h3>Cartography and Geographic Visualization</h3>

Bertin's work originated in cartography, and his principles remain integral

to map-making. The use of visual variables allows cartographers to layer information—such as population density, terrain, and infrastructure—in clear, interpretable ways. Modern GIS software continues to implement Bertin's variables to optimize map readability and functionality.

<h3>Data Visualization and Analytics</h3>

In the age of big data, Bertin's semiology provides a critical theoretical underpinning for visual analytics. Data scientists and analysts utilize his visual variables to create dashboards, infographics, and interactive visuals that facilitate data exploration and decision-making. Bertin's emphasis on the cognitive processing of visual information enhances user comprehension and prevents misinterpretation.

<h3>Information Design and User Experience</h3>

Beyond strict data visualization, Bertin's semiology influences information design in digital interfaces and user experience (UX) design. Understanding how users perceive size, color, and shape helps designers construct intuitive interfaces that communicate status, warnings, or navigation cues effectively.

<h2>Strengths and Limitations in Contemporary Context</h2>

While Jacques Bertin's semiology of graphics provides a robust framework, it is not without limitations. Its strength lies in its systematic approach and universality, but the evolution of digital media introduces complexities Bertin did not fully anticipate.

- **Strengths:** Bertin's visual variables allow for standardized, interpretable, and efficient graphic representations, facilitating cross-disciplinary communication.
- **Limitations:** The model predates modern interactive and dynamic visualizations, which involve temporal changes and user-driven exploration. Bertin's framework can be less effective in representing non-static or multidimensional data without adaptation.
- **Accessibility Considerations:** Some variables, such as color and value, may pose challenges for viewers with visual impairments, necessitating complementary design strategies.

Despite these challenges, Bertin's semiology remains a foundational reference point. Its principles continue to inform contemporary visualization heuristics, including the use of color palettes, symbol design, and layout optimization in tools like Tableau, Power BI, and D3.js.

<h2>Comparative Insights: Bertin versus Modern Visualization Theories</h2>

Comparing Jacques Bertin's semiology with modern visualization theories reveals both continuity and evolution. Whereas Bertin focused on static visual variables, contemporary approaches integrate interactivity, animation, and user engagement.

- **Tufte's Principles:** Edward Tufte expanded on Bertin's ideas by emphasizing minimalism and the elimination of chartjunk to enhance data clarity.
- **Interactive Visualization:** Tools today incorporate dynamic filtering, zooming, and temporal animation, aspects not covered in Bertin's original framework.
- **Cognitive Load Theory:** Modern design increasingly considers cognitive psychology to optimize information absorption, complementing Bertin's semiotic approach.

Nonetheless, Bertin's visual variables remain the underpinnings upon which these advancements build, underscoring their enduring relevance.

Jacques Bertin's semiology of graphics stands as a monumental contribution to understanding how humans interpret visual information. His methodical breakdown of visual variables continues to shape the principles of effective graphic communication, bridging art and science. As data grows in complexity and volume, Bertin's insights offer a timeless guide for crafting clear, meaningful, and impactful visual narratives.

Jacques Bertin Semiology Of Graphics

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jacques bertin semiology of graphics: *Semiology of Graphics* Jacques Bertin, 2011
Information processing entails comprehensivity. Communication involves simplification
jacques bertin semiology of graphics: *Semiology of Graphics* Jacques Bertin, 2002
jacques bertin semiology of graphics: Semiology of Graphics William J. Berg,
jacques bertin semiology of graphics: Visualization and Optimization Christopher V. Jones,
2013-04-17 This book arose out of an invited feature article on visualization and optimization that appeared in the ORSA Journal on Computing in 1994. That article briefly surveyed the current state of the art in visualization as it applied to optimization. In writing the feature article, it became clear

that there was much more to say. Apparently others agreed, and thus this book was born. The book is targeted primarily towards the optimization community rather than the visualization community. Although both optimization and visualization both seek to help people understand complex problems, practitioners in one field are generally unaware of work in the other field. Given the common goals of the respective fields, it seemed fruitful to consider how each can contribute to the other. One might argue that this book should not be focused specifically on optimization but on decision making in general. Perhaps, but it seems that there is sufficient material to create a book targeted specifically to optimization. Certainly many of the ideas presented in the book are applicable to other areas, including computer simulation, decision theory and stochastic modeling. Another book could discuss the use of visualization in these areas.

jacques bertin semiology of graphics: *A Framework for Visualizing Information* E.H. Chi, 2013-03-14 Fundamental solutions in understanding information have been elusive for a long time. The field of Artificial Intelligence has proposed the Turing Test as a way to test for the smart behaviors of computer programs that exhibit human-like qualities. Equivalent to the Turing Test for the field of Human Information Interaction (HII), getting information to the people that need them and helping them to understand the information is the new challenge of the Web era. In a short amount of time, the infrastructure of the Web became ubiquitous not just in terms of protocols and transcontinental cables but also in terms of everyday devices capable of recalling network-stored data, sometimes wirelessly. Therefore, as these infrastructures become reality, our attention on HII issues needs to shift from information access to information sensemaking, a relatively new term coined to describe the process of digesting information and understanding its structure and intricacies so as to make decisions and take action.

jacques bertin semiology of graphics: *Interactive Media: The Semiotics of Embodied Interaction* Shaleph O'Neill, 2008-09-18 The author discusses the existing theoretical approaches of semiotically informed research in HCI, what is useful and the limitations. He proposes a radical rethink to this approach through a re-evaluation of important semiotic concepts and applied semiotic methods. Using a semiotic model of interaction he explores this concept through several studies that help to develop his argument. He concludes that this semiotics of interaction is more appropriate than other versions because it focuses on the characteristics of interactive media as they are experienced and the way in which users make sense of them rather than thinking about interface design or usability issues.

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technology. Original interpretative essays set the literature into intellectual context within these themes. Excerpts are drawn from leading scholars and researchers in a range of cognate fields including: Cartography, Geography, Anthropology, Architecture, Engineering, Computer Science and Graphic Design. The Map Reader provides a new unique single source reference to the essential literature in the cartographic field: more than fifty specially edited excerpts from key, classic articles and monographs critical introductions by experienced experts in the field focused coverage of key mapping practices, techniques and ideas a valuable resource suited to a broad spectrum of researchers and students working in cartography and GIScience, geography, the social sciences, media studies, and visual arts full page colour illustrations of significant maps as provocative visual 'think-pieces' fully indexed, clearly structured and accessible ways into a fast changing field of cartographic research

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jacques bertin semiology of graphics: *International Handbook of Semiotics* Peter Pericles Trifonas, 2015-05-11 This book provides an extensive overview and analysis of current work on semiotics that is being pursued globally in the areas of literature, the visual arts, cultural studies, media, the humanities, natural sciences and social sciences. Semiotics—also known as structuralism—is one of the major theoretical movements of the 20th century and its influence as a way to conduct analyses of cultural products and human practices has been immense. This is a comprehensive volume that brings together many otherwise fragmented academic disciplines and currents, uniting them in the framework of semiotics. Addressing a longstanding need, it provides a global perspective on recent and ongoing semiotic research across a broad range of disciplines. The handbook is intended for all researchers interested in applying semiotics as a critical lens for inquiry across diverse disciplines.

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comprehension by humans and machines, notations: history, design and formalization, diagrams and education, reasoning with diagrams by humans and machines, and psychological issues in comprehension, production and communication.

jacques bertin semiology of graphics: Adaptive and Personalized Visualization Alvitta Ottley, 2022-05-31 There is ample evidence in the visualization community that individual differences matter. These prior works highlight various personality traits and cognitive abilities that can modulate the use of the visualization systems and demonstrate a measurable influence on speed, accuracy, process, and attention. Perhaps the most important implication of this body of work is that we can use individual differences as a mechanism for estimating when a design is effective or to identify when people may struggle with visualization designs. These effects can have a critical impact on consequential decision-making processes. One study that appears in this book investigated the impact of visualization on medical decision-making showed that visual aides tended to be most beneficial for people with high spatial ability, a metric that measures a person's ability to represent and manipulate two- or three-dimensional representations of objects mentally. The results showed that participants with low spatial ability had difficulty interpreting and analyzing the underlying medical data when they use visual aids. Overall, approximately 50% of the studied population were unsupported by the visualization tools when making a potentially life-critical decision. As data fluency continues to become an essential skill for our everyday lives, we must embrace the growing need to understand the factors that may render our tools ineffective and identify concrete steps for improvement. This book presents my current understanding of how individual differences in personality interact with visualization use and draws from recent research in the Visualization, Human-Computer Interaction, and Psychology communities. We focus on the specific designs and tasks for which there is concrete evidence of performance divergence due to personality. Additionally, we highlight an exciting research agenda that is centered around creating tailored visualization systems that are aligned with people's abilities. The purpose of this book is to underscore the need to consider individual differences when designing and evaluating visualization systems and to call attention to this critical research direction.

jacques bertin semiology of graphics: Making Sense of Data III Glenn J. Myatt, Wayne P. Johnson, 2011-09-09 Focuses on insights, approaches, and techniques that are essential to designing interactive graphics and visualizations Making Sense of Data III: A Practical Guide to Designing Interactive Data Visualizations explores a diverse range of disciplines to explain how meaning from graphical representations is extracted. Additionally, the book describes the best approach for designing and implementing interactive graphics and visualizations that play a central role in data exploration and decision-support systems. Beginning with an introduction to visual perception, Making Sense of Data III features a brief history on the use of visualization in data exploration and an outline of the design process. Subsequent chapters explore the following key areas: Cognitive and Visual Systems describes how various drawings, maps, and diagrams known as external representations are understood and used to extend the mind's capabilities Graphics Representations introduces semiotic theory and discusses the seminal work of cartographer Jacques Bertin and the grammar of graphics as developed by Leland Wilkinson Designing Visual Interactions discusses the four stages of design process—analysis, design, prototyping, and evaluation—and covers the important principles and strategies for designing visual interfaces, information visualizations, and data graphics Hands-on: Creative Interactive Visualizations with Protovis provides an in-depth explanation of the capabilities of the Protovis toolkit and leads readers through the creation of a series of visualizations and graphics The final chapter includes step-by-step examples that illustrate the implementation of the discussed methods, and a series of exercises are provided to assist in learning the Protovis language. A related website features the source code for the presented software as well as examples and solutions for select exercises. Featuring research in psychology, vision science, statistics, and interaction design, Making Sense of Data III is an indispensable book for courses on data analysis and data mining at the upper-undergraduate and graduate levels. The book also serves as a valuable reference for computational statisticians, software engineers,

researchers, and professionals of any discipline who would like to understand how the mind processes graphical representations.

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jacques bertin semiology of graphics: Data Visualization Lauren Magnuson, 2016-09-15 Data Visualization: A Guide to Visual Storytelling for Libraries is a practical guide to the skills and tools needed to create beautiful and meaningful visual stories through data visualization. Learn how to sift through complex datasets to better understand a variety of metrics, such as trends in user behavior and electronic resource usage, return on investment (ROI) and impact metrics, and data about library collections and repositories. Sections include: ·Identifying and interpreting datasets for visualization ·Tools and technologies for creating meaningful visualizations ·Case studies in data visualization and dashboards Data Visualization also features a 20-page color insert showcasing a wide variety of visualizations generated using an array of data visualization technologies and programming languages that can serve as inspiration for creating your own visualizations. Understanding and communicating trends from your organization's data is essential. Whether you are looking to make more informed decisions by visualizing organizational data, or to tell the story of your library's impact on your community, this book will give you the tools to make it happen.

jacques bertin semiology of graphics: New Challenges for Data Design David Bihanic, 2014-12-27 The present work provides a platform for leading Data designers whose vision and creativity help us to anticipate major changes occurring in the Data Design field, and pre-empt the future. Each of them strives to provide new answers to the question, "What challenges await Data Design?" To avoid falling into too narrow a mind-set, each works hard to elucidate the breadth of Data Design today and to demonstrate its widespread application across a variety of business sectors. With end users in mind, designer-contributors bring to light the myriad of purposes for which the field was originally intended, forging the bond even further between Data Design and the aims and intentions of those who contribute to it. The first seven parts of the book outline the scope of Data Design, and presents a line-up of "viewpoints" that highlight this discipline's main topics, and offers an in-depth look into practices boasting both foresight and imagination. The eighth and final part features a series of interviews with Data designers and artists whose methods embody originality and marked singularity. As a result, a number of enlightening concepts and bright ideas unfold within the confines of this book to help dispel the thick fog around this new and still relatively unknown discipline. A plethora of equally eye-opening and edifying new terms, words, and key expressions also unfurl. Informing, influencing, and inspiring are just a few of the buzz words belonging to an initiative that is, first and foremost, a creative one, not to mention the possibility to discern the ever-changing and naturally complex nature of today's datasphere. Providing an invaluable and cutting-edge resource for design researchers, this work is also intended for students, professionals and practitioners involved in Data Design, Interaction Design, Digital & Media Design, Data & Information Visualization, Computer Science and Engineering.

jacques bertin semiology of graphics: Art as Demonstration Sven Spieker, 2024-02-06 How artists wield demonstration to question the status quo both aesthetically and politically, marshaling art and education as powerful agents of change. Demonstration, in short, says: See here. It is the practice of pointing to something in order to explain or contest it. As such, Sven Spieker argues that demonstration has helped reshape art from the height of the Cold War to the late twentieth century, reformatting our understanding of how art and political engagement relate to each other. Focusing on Western Europe (especially Germany), Eastern Europe, and the United States, Art as Demonstration expands on contemporary discussions of art-as-protest, activism, and resistance. Spieker shows how a closer, more historical look at art's connection with demonstration reconnects us with earlier efforts, notably by the early twentieth-century avant-garde, to marshal art for the purpose of instruction and engagement. Art as Demonstration reconceives the history of postwar art

in Eastern and Western Europe from the perspective of demonstration, understood formally (as a technique for showing and pointing) as well as politically (as protest, resistance, etc.). Close analyses of individual artworks reveal how the deployment of demonstration has changed over time. Spieker shows how “protest” and “resistance” organize art and artists not only politically but also and especially formally and aesthetically—a development of particular importance in the Cold War art and politics of Eastern Europe. The book illustrates how from the 1960s onward demonstration radically changed the way artists thought about art: no longer as an object but as a form of education.

jacques bertin semiology of graphics: System Analysis and Modeling: Models and Reusability Daniel Amyot, Pau Fonseca i Casas, Gunter Mussbacher, 2014-09-24 This book constitutes the refereed papers of the proceedings of the 8th International Conference on System Analysis and Modeling, SAM 2014, held in Valencia, Spain, in September 2014. The 18 full papers and the 3 short papers presented together with 2 keynotes were carefully reviewed and selected from 71 submissions. The contributions are organized in topical sections named: reuse; availability, safety and optimization; sequences and interactions; testing; metrics, constraints and repositories; and SDL and V&V.

jacques bertin semiology of graphics: Dark Writing Paul Carter, 2008-10-31 We do not see empty figures and outlines; we do not move in straight lines. Everywhere we are surrounded by dapple; the geometry of our embodied lives is curviform, meandering, bi-pedal. Our personal worlds are timed, inter-positional, and contingent. But nowhere in the language of cartography and design do these ordinary experiences appear. This, Dark Writing argues, is a serious omission because they are designs on the world: architects and colonizers use their lines to construct the places where we will live. But the rectilinear streets, squares, and public spaces produced in this way leave out people and the entire environmental history of their coming together. How, this book asks, can we explain the omission of bodies from maps and plans? And how can we redraw the lines maps and plans use so that the qualitative world of shadows, footprints, comings and goings, and occasions—all essential qualities of places that incubate sociality—can be registered? In short, Dark Writing asks why we represent the world as static when our experience of it is mobile. It traces this bias in Enlightenment cartography, in inductive logic, and in contemporary place design. This is the negative critique. Its positive argument is that, when we look closely at these designs on the world, we find traces of a repressed movement form. Even the ideal lines of geometrical figures turn out to contain traces of earlier passages; and there are many forms of graphic design that do engage with the dark environment that surrounds the light of reason. How can this dark writing—so important to reconfiguring our world as a place of meeting, of co-existence and sustaining diversity—be represented? And how, therefore, can our representations of the world embody more sensuously the mobile histories that have produced it? Dark Writing answers these questions using case studies: the exemplary case of the beginnings of the now world-famous Papunya Tula Painting Movement (Central Australia) and three high-profile public place-making initiatives in which the author was involved as artist and thinker. These case studies are nested inside historical chapters and philosophical discussions of the line and linear thinking that make Dark Writing both a highly personal book and a narrative with wide general appeal.

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