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Thomas Fischer • Christiane M. Herr
Editors

Design Cybernetics

Navigating the New

Springer

Editors
Thomas Fischer
Department of Architecture
Xi'an Jiaotong-Liverpool University
Suzhou, Jiangsu Province, China

Christiane M. Herr
Department of Architecture
Xi'an Jiaotong-Liverpool University
Suzhou, Jiangsu Province, China

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Foreword
Ranulph's Heritage: Design Cybernetics

Most people will initially perceive design and cybernetics as two very separate fields, but as will become clear from this book, both fields have a lot to offer to each other. The work of Ranulph Glanville has enormously contributed to making researchers understand the potential and mutual value. In fact, Ranulph inspired many designers with concepts from cybernetics, and, by doing so, he learned from them to sharpen his ideas of cybernetics and then brought these back to cyberneticians. This book captures Ranulph's heritage and develops a foundational layer for research in architecture, design and arts (the creative disciplines). In doing so, it establishes the field of *design cybernetics*. As such, this book should be warmly welcomed as a valuable and relevant continuation of what Ranulph and others have been working on for a while.

(Second-order) cybernetics has developed into a meta-field which studies systems and develops overarching principles. It takes a constructivist perspective and seriously values the observer being part of the system. This is a fundamental concept connecting to the recent shifts in science which more and more recognise the value of the specific and subjective position of the researcher-observer. It is the position in which the researchers in architecture, design and arts undertake their endeavours. Fundamental is the understanding that the researcher-observer is part of the system and not an observer who is neutral and external to the system he/she is researching. It also embraces the subjective position of the designer in all his/her work. To value the specificity and the potential of such experiences is very much in line with the way venturous practitioners research, not by trying to establish objective observations but to construct knowledge from the personal and specific observations and actions.

A further relevant quality which resides in cybernetics is that it is interested in opening up possibilities and choice; this is something many designers and artists value and are looking for as well. Furthermore, many designer-researchers do not fully understand their knowledge processes, how our understanding comes into being and how their research develops. The concept of conversation reflection, and sketching as a way of a conversation with the self will help us in explaining their underlying cognitive processes.

I first met Ranulph Glanville at the eCAADe Conference 1995 in Palermo. Adam Jakimowicz (from TU Bialystok, Poland) introduced me to him in the lobby of a hotel, and he immediately made a strong impression on me. We did have a little bit of small talk, he made a couple of funny comments, and it soon became clear he was a special person. He was interested in learning from people, and it turned out that he was interested in how one could use digital systems in unconventional ways to let the computer surprise you. This perspective was interesting and refreshing in a community where technical possibilities and developments were high on the agenda and the main focus.

Some years later, he visited my family and playfully interacted with my children. He did it in such a way they became interested in learning from him (even though there were huge language barriers as they were still very young). He told stories and anecdotes, at the same time connecting to their interests and asking questions in such a way their thinking was stimulated, hence opening their view on the world and what was going on. I understood that this was his way of probing and testing and exploring the world in a playful way, educating others and helping them to learn and, at the same time, improving and learning himself. It was his way of living and behaving. In his genuinely cybernetic way of living, Ranulph acted on everything which and everyone who entered his range of attention. This happened playfully and enjoyably. He always tried to learn and to help others gain insight and make them learn. He tried to bring delight, to push borders and trigger innovation.

Only much later on, I learned Ranulph was an expert in cybernetics, a field which was at that time completely unknown to me. The field is also mostly unknown to architects and designers, although it includes many relevant concepts for them. Ranulph was educated in architecture and received his degree from the Architectural Association (AA) School in London. During his final year, he spent most of his time working with Gordon Pask and soon began contributing to developing cybernetics. Later on, he further developed and became a proponent of second-order cybernetics.

Having interacted with Ranulph Glanville for many years (and having spent some time during the holidays with him and his "Mrs. wife", the wonderful Aartje Hulstein), I feel privileged to write the Foreword for this book, *Design Cybernetics: Navigating the New*. Having experienced the value of Ranulph's work and cybernetics in general to research in architecture, design and arts, it is wonderful to see how cybernetics and the creative disciplines are brought together in this book.

Although he may have gained more recognition in the field of cybernetics, his impact on research in architecture, design and arts should not be undervalued. To develop his ideas, he found a fertile context supporting and contributing to the development of the PhD programmes at RMIT,[1] Sint-Lucas School of Architecture

[1]Van Schaik, Leon and Anna Johnson. 2011. *By Practice, BY invitation: Design practice research in architecture and design at RMIT, 1986–2011*. Melbourne: onepointsixone. http://www.blurb.com/books/3599320-the-pink-book

(KU Leuven)[2] and the RCA (Royal College of Arts, London).[3] He talked to PhD candidates and helped and inspired them. He did so by asking questions and trying to help to explicate their ways of developing knowledge. He was a fan of Samuel Beckett's phrase "Fail, fail again, fail better". At the same time, his work in these schools and how he inspired and positively impacted on the doctoral candidates prove the value cybernetic thinking brings to architecture, design, and arts. Consequently, I am convinced this book will further Ranulph's heritage into future research endeavours. Through his cybernetic way of looking for surprise and his interest in every phenomenon, Ranulph helped designers to explicate and value the qualities in what they are doing. It is this attitude, not imposing any specific method but looking for the interesting and inspiring, valuing the observations and the experiences, as a subjective observer within a system or activity, which helps to develop a fertile research context in the creative disciplines. It is this attitude which is part of a cybernetic way of looking and experiencing the world that is of paramount relevance for the creative disciplines. Moreover, it is this position which is explained, clarified and explicated in this book. The book helps the reader to develop a deeper understanding of key concepts of cybernetics which may help to develop the research of venturous practitioners and creative researchers.

Research in the field of the creative disciplines has been developing enormously during the last three decades, partly because of pressure from governments, partly because of the Bologna declaration and partly because schools see the benefit in developing research. This is reflected in a growing number of prominent PhD programmes, academic conferences and research projects, especially artistic research, research by design and creative practice research value building on the vast (usually tacit) knowledge residing in creative processes and practices.

Although momentum has been gained and there is much developing and wonderful PhD projects have been completed, many researchers find challenges in their school and university contexts to argue the value of their undertakings. As they position themselves as designers and researchers, it is obvious they take a very different perspective than the positivist one. It is in this context that this book, *Design Cybernetics: Navigating the New*, becomes useful. It provides a background and context to explain the knowledge processes in the creative disciplines. Furthermore, it shows that what is happening in these disciplines should not be seen as something special but as something which is very much in line with what is happening in other disciplines. Cybernetics comes in very useful here. Cybernetics and this book bring a position where it is natural to position oneself as a researcher within the system one is observing. It also values a constructivist approach. It is this fundamental position which is crucial to further the creative disciplines in their research endeavours, and it is cybernetics and this book which bring the arguments and the foundation, a crucial

[2] Verbeke, Johan. 2016. Ranulph and Sint-Lucas. *In Ranulph Glanville. Art architecture cybernetics design. London and the 1960s*, eds. Marianne Ertl, Werner Korn, and Albert Müller, 33–44. Vienna: edition echoraum.

[3] https://vimeo.com/131408983

and highly needed open and inclusive perspective on knowledge and how to extract it from our experiences and undertakings. Hence, this book is highly needed and timely as it will allow in consolidating and building further on the explorative work of the past years.

To make these statements more tangible for the reader, I will introduce two short examples. Occam's razor[4] is a very well-known concept, the idea of simplicity (which is also connected to beauty and aesthetics) bringing the best explanation for a phenomenon. Designers usually deal with a mess and a multitude of issues, all brought together in wicked problems. While architects, designers and artists are inclined to work towards solving the big complex problems, Occam's razor helps us to focus on the simple but powerful aspects which bring understanding and delight. It has helped researchers to suddenly understand what was the important issue they were dealing with.

Ashby's law of requisite variety[5] is very relevant for architects and designers. At the moment in time where we begin to understand that it is impossible to control cities, Ashby's law makes researchers understand they should not aim for trying to control societal development with more and more sophisticated systems, but they should aim for allowing possibilities within a certain range. This is very relevant in architecture and urban design, especially when discussing smart cities.

The authors of the chapters in this book have been active in the domain for many years, some more in cybernetics while others more from the design perspective. They bring a wide range of experiences, and this is one of the qualities of this book. The wide range of contributions, from a more historical background and theoretical chapters to design perspectives, contributes to a stimulating experience for the reader. Consequently, researchers in cybernetics as well as in design and practice will find valuable insight in this book.

In line with the above perspective, this book will be a great reading for (a) cyberneticians as they can learn from the use of concepts in design – it will bring these concepts into reality – and (b) researchers in architecture, design and arts as they will find concepts and theories which shine new light on their work. It will especially bring explorative and innovative perspectives on what research has to offer to researchers in the creative disciplines. It will help researchers struggling to find ways forward by offering paths to pursue in doing what brings delight.

The book is an entertaining and inspiring collection of chapters. These range from more historical to more connected to design research as is very well explained in the Preface. The book is interesting as it gives the reader, either a researcher in design or his/her supervisor, a meta-level perspective which will help to frame the research. Furthermore, it will provide a range of concepts and perspectives which will help them explain how knowledge comes into being and how processes bring value. The book is worth reading and studying as it offers researchers ways to find confidence in how they position themselves in academia.

[4]"Entities must not be multiplied beyond necessity" being one of the popular formulations.

[5]The degree of control of a system is proportional to the amount of information available.

The book can be seen as a sincere effort by a group of excellent researchers to bridge the gap between cybernetics and architecture, design and arts in establishing a transdisciplinary field of design cybernetics. It can be expected that in the future, design cybernetics will impact on both cybernetics and the creative disciplines. Consequently, it will contribute to opening the understanding of what research in these fields is for more possibilities and variety. I am convinced this is the start of a great new development.

Aarhus/Elewijt
July 2017

Prof. Dr. Johan Verbeke[6]

[6]Editor's note: Johan Verbeke unexpectedly passed away on Sunday, August 6, 2017, at the age of 55, shortly after contributing the Foreword to this volume.

Preface

The convergence of design and cybernetics continues to be a major undertaking spanning several decades and disciplines and involving numerous contributors. Of these, nobody has contributed to the establishment of design cybernetics as much as Ranulph Glanville (shown with his wife, Aartje Hulstein, in Fig. 1). Having been introduced to cybernetics by Gordon Pask while studying at the Architectural Association in London in the 1960s, Glanville spent the following decades bringing design and cybernetics together in various ways, developing an explicitly cybernetic theory of design between the 1970s and late 2014.

Fig. 1 Aartje Hulstein and Ranulph Glanville upon receiving the American Society for cybernetics' joint 2014 special award at the Clarion Collection Hotel Savoy in Oslo on the 17th of October 2014

Milestones by which Glanville helped establish design cybernetics (besides his numerous writings, presentations, thesis supervisions and so on) include his guest-editing of a 2007 special double issue of the journal *Kybernetes* on the subject of cybernetics and design; his chairing of the 2010 conference of the American Society for Cybernetics titled "Cybernetics: Art, Design, Mathematics" at Rensselaer Polytechnic Institute in Troy, NY; the publication of his *The Black Boox* trilogy with edition echoraum in Vienna in 2009, 2013 and 2014; as well as his keynote lecture titled *How design and cybernetics reflect each other* at the Third Relating Systems Thinking and Design Symposium in Oslo in October of 2014. Now, over a decade after the *Kybernetes* special issue, this volume brings together another collection of articles on design cybernetics with an emphasis on design research, including a reprint of the paper Glanville himself contributed to the 2007 *Kybernetes* issue.

Involved in several postgraduate programmes including RMIT University, the RCA and KU Leuven, Glanville travelled extensively and described himself as a faculty member of the "University of 747". Many who encountered Glanville in these predominantly architectural contexts, including several authors contributing to this volume, adopted design cybernetics as integral parts of their approaches to research. The roots at the Architectural Association and Glanville's impact in leading postgraduate architectural programmes contributed to the close connections between design cybernetics and architecture in recent decades.

The initiative to produce this volume originated during a breakfast conversation at the Scandic Hotel Potsdamer Platz in Berlin during the 2015 conference of the International Society for the Systems Sciences (ISSS), half a year after Glanville's death, when seven of us, all mid-career academics, resolved to celebrate Glanville's design cybernetics with an edited collection of our Glanville-inspired work. Our group soon grew to include more representatives of a new generation of design cyberneticians engaged in the advancement of design cybernetics in a range of fields, extending well beyond our group's earlier architectural centre of gravity. Once we had the opportunity to propose this volume for inclusion in Springer's Design Research Foundations series, we followed the series editors' encouragement to also seek contributions from eminent design cyberneticians. The volume then grew to its present form and now offers a comprehensive cross-section of work undertaken in design cybernetics.

The 16 chapters presented here offer readers a multitude of perspectives on the field of design cybernetics, ranging across architecture, interior lighting studies, product design, embedded systems, design pedagogy, design theory, social transformation design, enquiry theory, art and poetics as well as theatre and acting. We hope this variety will offer suitable entry points to design cybernetics for readers from a similarly broad range of backgrounds. Readers will identify overlaps and intersections as well as differences and contrasts between the contributions included here. We believe these reflect the subjective appropriation and appreciation of concepts described by radical constructivism, a close relative of second-order cybernetics. This plurality of perspectives and voices, we hope, will illuminate and contextualise design cybernetics in ways that are accessible to readers from various design-related backgrounds. Furthermore, we offer any differences readers

may identify between the following contributions as invitations to engage with design cybernetics, to participate and to contribute to the field's further development.

We open this collection with an introduction to design cybernetics, tracing the development of both design research and cybernetics since World War II to realisations of the limits of control, and on to the second-order cybernetic conception of design as an open-ended, conversational and ethical process.

In a reprint of his 2007 *Kybernetes* article, Ranulph Glanville establishes design and cybernetics as complementary arms of each other. Presenting cybernetics as a theory for design, and design as cybernetics in practice, Glanville notes that both cybernetics and design imply the same ethical qualities, which stand in contrast to qualities associated with traditional scientific research. Glanville makes the case that scientific research is a subset of design.

Liss C. Werner illuminates design cybernetics from the perspective of its origins in conversation theory, developed by the British cybernetician, Gordon Pask.

Approaching design as conversation, Hugh Dubberly and Paul Pangaro offer a second-order cybernetic framing of *both* the means (process) and the ends (outcomes) of designing and present "second-order design" as creating possibilities for others to have conversations.

Delfina Fantini van Ditmar critically examines and questions the embedded epistemology of the Internet of Things (IoT), which she refers to as the algorithmic paradigm, when applied to human activities in "smart" homes.

In a thoroughly updated version of a 2007 paper, Klaus Krippendorff reciprocally connects cybernetics and design and contrasts both with what the sciences do. After developing cybernetic epistemologies that constructively embrace the practices of design, he applies cybernetics to the emergence of artefacts in interactions between organisms and their environments, associating cybernetic epistemology with the evolution of sensory-motor coordinations, not of things, and finally develops a cybernetics of human-centred design.

Based on Glanville's observation that design and research are fundamentally related and that design methods may be applied across domains, Ted Krueger and Ute C. Besenecker present a case study of the perceptual effects of alternate contemporary lighting technologies at an architectural scale to show how designers/researchers can approach this kind of investigation from a design-cybernetic perspective.

Christiane M. Herr introduces radical constructivist theory in the context of design cybernetics and illustrates how its approach to learning complements and extends the conversational perspective on designing and reviews implications of radical constructivist epistemology for design research and design education.

Highlighting some prevalent features of contemporary devised theatre practice, Tom Scholte develops parallels between Halprin's *RSVP cycles* and Glanville's cybernetic conception of design in which lack of control, transcomputable complexity and under-specification of the problems investigated become virtues that propel us on a conversational forward search in which we must "act in order to understand" while bound by a deep ethical commitment to the autonomy of others.

Ben Sweeting reviews the intimate relationship between cybernetics and design in terms of their shared concerns with conversational interaction, drawing on the work of Ranulph Glanville and Gordon Pask.

Michael Hohl argues that design educators and design students may learn from cultural traditions of the Polynesian Voyaging Society and from its "Eight Elements of Education", explaining that this source of informal knowledge, combined with modern means to communicate and to collaborate, can lead to new, more empathetic, ethical and environmentally aware ways of designing.

Timothy Jachna draws on second-order cybernetic principles and concepts, particularly those associated with Pask's conversation theory and subsequent work inspired by and derived from it, to propose a conceptual basis for articulating modalities of designing with others.

Taking uncertainty and limited understanding as fundamental, Claudia Westermann argues that any activity is a design activity and presents second-order cybernetics as a basis for design poetics.

Thomas Fischer presents a *theory of (and for) enquiry* to show postgraduate and PhD design researchers and their supervisors how the challenge of defending their work may be approached where thesis examinations continue to adhere to tenets of (natural) science – not by creating inscrutable emulsions between design and scientific research but by concatenating and nesting multiple modes of design research.

Larry Richards describes cybernetics as a way of thinking about ways of thinking and, from the cybernetic vocabulary of choice and autonomy, develops an ethics for social transformation in which violence is not an alternative or, at least, is an alternative of last resort.

Wolfgang Jonas then presents a summarising and reflecting chapter in which he contextualises and critiques the positions offered in the preceding contributions. He identifies the further development and strengthening of design cybernetics as an urgent task ahead of us, to ensure its continuation in the harsh and unfriendly context of digitised global capitalism.

With this collection, we address cybernetically inclined designers and design researchers, and we hope to demonstrate the rigour, quality and potential of design cybernetics, not only in its formal manifestations but, first and foremost, in its aesthetic and ethical manifestations in the wider sphere of human judgement and values. As the easier-to-grasp first-order cybernetic subset of control engineering has taken the world by storm, the more-challenging-to-grasp second-order cybernetics of design spreads at a slower rate. This calls for an accommodating design cybernetic agenda of simplification and of exemplification. The present volume, we hope, will serve as a stepping stone in that agenda.

Finally, we acknowledge the valuable support we received while editing this volume, in particular from the editors of Springer's Design Research Foundations series, Clementine Thurgood, Ilpo Koskinen and Pieter E. Vermaas. For the permission to reprint Ranulph Glanville's article Try again. Fail again. Fail better, we thank Emerald, who published it in *Kybernetes* 36(9/10) on pages 1173–1206. As this article has subsequently also been published in volume II (pages 253–292)

of Ranulph Glanville's *The Black Boox* trilogy with edition echoraum in Vienna, we are also indebted to Aartje Hulstein as well as to Albert Müller of the Department of Contemporary History at the University of Vienna for their reprint permission and for their kind advice. We also thank the Gordon Pask Archive in Vienna for their valuable advice and support.

Suzhou, China
January 30, 2019

Thomas Fischer
Christiane M. Herr

Contents

Contributors

Ute C. Besenecker Raumseele, West Warwick, RI, USA

Delfina Fantini van Ditmar Royal College of Art, Kensington Gore, London, UK

Hugh Dubberly Dubberly Design Office, San Francisco, CA, USA

Thomas Fischer Department of Architecture, Xi'an Jiaotong-Liverpool University, Suzhou, Jiangsu Province, China

Ranulph Glanville is deceased

Christiane M. Herr Department of Architecture, Xi'an Jiaotong-Liverpool University, Suzhou, Jiangsu Province, China

Michael Hohl Faculty of Design, Anhalt University of Applied Sciences, Dessau-Roßlau, Germany

Timothy Jachna College of Design, Architecture, Art and Planning, University of Cincinnati, Cincinnati, OH, USA

Wolfgang Jonas Braunschweig University of Art, Braunschweig, Germany

Klaus Krippendorff The Annenberg School for Communication, University of Pennsylvania, Philadelphia, PA, USA

Ted Krueger School of Architecture, Greene Building 212, Rensselaer Polytechnic Institute, Troy, NY, USA

Paul Pangaro Human-Computer Interaction Institute, Carnegie Mellon University, Pittsburgh, PA, USA

Laurence D. Richards Indiana University East, Richmond, IN, USA

Tom Scholte Department of Theatre and Film, University of British Columbia, Vancouver, BC, Canada

Ben Sweeting School of Architecture and Design, University of Brighton, Brighton, UK

Liss C. Werner Institute of Architecture, Technical University of Berlin, Berlin, Germany

Claudia Westermann Department of Architecture, Xi'an Jiaotong-Liverpool University, Suzhou, Jiangsu Province, China

Acronyms

AA	Architectural Association
AMG	Architecture Machine Group
AI	Artificial Intelligence
ASC	American Society for Cybernetics
BCL	Biological Computer Laboratory
CT	Conversation Theory
DRS	Design Research Society
DoD	Department of Defense
EMPAC	The Curtis R. Priem Experimental Media and Performing Arts Center
GPA	Gordon Pask Archive
HCD	Human-Centred Design
HCI	Human-Computer Interaction
ICA	Institute of Contemporary Arts, London
IoT	Internet of Things
ISSS	International Society for the Systems Sciences
KU	Catholic University of Leuven
MIT	Massachusetts Institute of Technology
NASA	National Aeronautics and Space Administration
NTM	Non-trivial Machine
PVS	Polynesian Voyaging Society
RCA	Royal College of Art
RIBA	Royal Institute of British Architects
RMIT	Royal Melbourne Institute of Technology
SD	Systems Dynamics
SoC	Second-Order Cybernetics
STS	Science and Technology Studies
TM	Trivial Machine