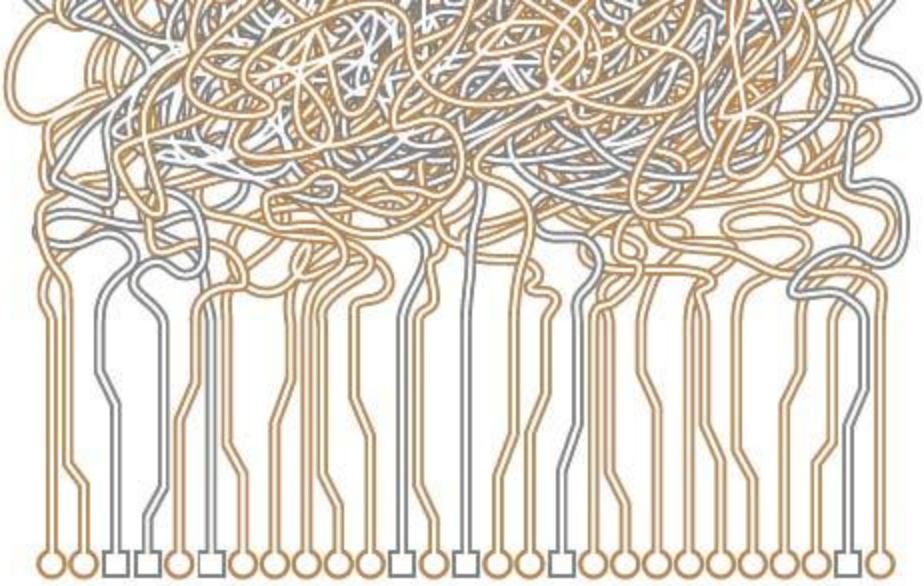

SWITCHING CODES

THINKING THROUGH DIGITAL TECHNOLOGY IN THE HUMANITIES AND THE ARTS

EDITED BY
THOMAS BARTSCHERER
AND
RODERICK COOVER

SWITCHING CODES

SWITCHING CODES

Thinking Through Digital Technology in the Humanities and the Arts

EDITED BY

THOMAS BARTSCHERER
AND RODERICK COOVER

THE UNIVERSITY OF CHICAGO PRESS
CHICAGO + LONDON

Thomas Bartscherer is assistant professor of humanities and director of the Language and Thinking Program at Bard College. He is coeditor of *Erotikon: Essays on Eros Ancient and Modern,* also published by the University of Chicago Press. Roderick Coover is associate professor in the Department of Film and Media Arts at Temple University. He is the author of the digital publications *Cultures in Webs: Working in Hypermedia with the Documentary Image and Vérité to Virtual: Conversations on the Frontier of Film and Anthropology.*

The University of Chicago Press, Chicago 60637
The University of Chicago Press, Ltd., London

Printed in the United States of America

20 19 18 17 16 15 14 13 12 11 1 2 3 4 5

ISBN-13: 978-0-226-03830-8 (cloth)
ISBN-13: 978-0-226-03831-5 (paper)
ISBN-10: 0-226-03830-0 (cloth)
ISBN-10: 0-226-03831-9 (paper)

Library of Congress Cataloging-in-Publication Data
Switching codes : thinking through digital technology in the humanities and the arts / edited by Thomas Bartscherer and Roderick Coover.
p. cm.
Includes index.
ISBN-13: 978-0-226-03830-8 (cloth : alk. paper)
ISBN-10: 0-226-03830-0 (cloth : alk. paper)
ISBN-13: 978-0-226-03831-5 (pbk. : alk. paper)
ISBN-10: 0-226-03831-9 (pbk. : alk. paper)
1. Communication in learning and scholarship—Technological innovations. 2. Information technology. 3. Humanities—Information technology. 4. Arts—Information technology. I. Bartscherer, Thomas. II. Coover, Roderick.
AZ195.S95 2011
303.48'33—dc22

2010048752

♾ The paper used in this publication meets the minimum requirements of the American National Standard for Information Sciences—Permanence of Paper for Printed Library Materials, ANSI Z39.48-1992.

CONTENTS

Introduction 1
Thomas Bartscherer and Roderick Coover

I. Research, Sense, Structure

How Computation Changes Research 15
Ian Foster

We Digital Sensemakers 38
Mark Stefik

Scholarsource: A Digital Infrastructure for the Humanities 61
Paolo D'Iorio and Michele Barbera

Responses

89 . . . . . "We Will Really Know"
Alan Liu

95 . . . . . On Scholarship
Graham White

II. Ontology, Semantic Web, Creativity

Switching Partners: Dancing with the Ontological Engineers 103
Werner Ceusters and Barry Smith

The Semantic Web from the Bottom Up 125
James Hendler

Logical Induction, Machine Learning, and Human Creativity 140
Jean-Gabriel Ganascia

Responses

161 . . . . . Relating Modes of Thought
William J. Clancey

184 . . . . . Intelligence and the Limits of Codes
Albert Borgmann

INTERLUDE: FIGMENT: THE SWITCHING CODES GAME ERIC ZIMMERMAN 191

III. Panorama, Interactivity, Embodiment

The Digital Panorama and Cinemascapes 199
Roderick Coover

Re-place: The Embodiment of Virtual Space 218
Jeffrey Shaw, Sarah Kenderdine, and Roderick Coover

Response

239 . . . . . Rewiring Culture, the Brain, and Digital Media
Vibeke Sorensen

IV. Re/presentations: Language and Facsimile

Electronic Linguistics 249
George Quasha in dialogue with Gary Hill

The Migration of the Aura, or How to Explore the Original through Its Facsimiles 275
Bruno Latour and Adam Lowe

Responses

299 . . . . . The Truth in Versions
Charles Bernstein

301 . . . . . Pamphlets, Paintings, and Programs: Faithful Reproduction and Untidy Generativity in the Physical and Digital Domains
Judith Donath

EPILOGUE: ENQUIRE WITHIN UPON EVERYTHING RICHARD POWERS 307

315 . . . . . List of Contributors

321 . . . . . Index

SWITCHING CODES

Introduction

1

The aim of this volume can be simply put: to bring together scholars, scientists, and artists to reflect on the impact of digital technology on thought and practice in the humanities and the arts. It may seem improbable that there would be an antihero in a book like this—or a hero, for that matter—but so there is, as one discovers upon reading the epilogue. And while this is not the only improbable feature of *Switching Codes*, it's a good one to flag at the start, for it turns out that the antihero, who is never given a proper name, is in a way a proxy, or perhaps a foil, for you, dear reader.

It will help to know that the novelist Richard Powers, the author of the epilogue, accepted the editors' invitation to read the ten primary essays and to respond in writing, with the genre of the response left entirely to his discretion. And I trust it won't be too much of a spoiler to reveal that he chose to write a piece of fiction, a condensed biographical tale, set mostly in the near future, that begins with an allusion to Charles Dickens's meditation on the French Revolution, *A Tale of Two Cities*. The implication, one imagines, is that the latter days of the digital revolution may be, in some sense, the best of times and the worst of times.

In the case of the humanities, writes the computer scientist Ian Foster in the book's opening essay, "computation . . . has the potential to transform . . . how humans communicate, work, and play, and thus—to some extent—what it means to be human." Foster then envisions the state of scholarly research in the year 2030, shaped by the pervasive influence of digital technology. Powers takes to heart this projection and those of other contributors and responds by placing his protagonist at a time when the technological developments they anticipate have come to fruition. The narrator conjures this future world by recounting the story of one life, thought and written into being for the present volume.

It is precisely this kind of dialogue—the exchange between Powers and the other contributors—that *Switching Codes* aims to facilitate. The impediments to such a dialogue have often been referred to collectively as the "two cultures" problem, a phrase that first gained currency through an influential 1959 lecture by C. P. Snow. Snow, himself both a scientist and a novelist, argued that in the modern world scientific and humanistic discourses were becoming increasingly isolated from one another, to the detriment of both (1961).[1] At the time—thirty years before the birth of the World Wide Web—digital technology was in its infancy and the revolution it would precipitate was but a twinkle in the eye of rare clairvoyants like Vannevar Bush (1945).

With the spectacular expansion of information technology (IT) in the past four decades, the "two cultures" problem has become considerably more complicated. In ways that Snow could hardly have anticipated, the culture of arts and letters is now permeated by science in the form of information technology, from word processing and semantically structured research networks to computer-generated imagery, interactive cinema, and creative machines. The very idea of "information science" indicates how "deeply intertwingled" the two cultures have become (Nelson 1987). Yet mutual incomprehension persists. Generally speaking, scholars and artists understand little about the technologies that are so radically transforming their fields, while IT specialists often have scant or no training in the humanities or traditional arts.

Switching Codes is conceived as a response to this problem, an attempt to bring scholars and artists into more robust dialogue with computer scientists and programmers. There are, to be sure, an increasing number of individuals who have real competence in both domains—indeed, some of them have contributed to this volume. But these cases are still rare. And so, for the most part, we have sought out specialists from each side of this digital divide who are open to and interested in genuine exchange. We have asked them to choose topics that they are actively researching, issues that are vital in their own disciplines. At the same time, however, we have urged them to write for a broader audience, in the hope that all of the contributions might be comprehensible and (at least potentially) useful to experts in a wide range of fields. We have encouraged contributors also to engage with themes that have resonance beyond the discipline or context in which they originate—traveling concepts, as they are sometimes called (Bal 2002). "Ontology," for example, denotes a branch of philosophy, one of the oldest and most fertile, but in recent years it has also become a term of art in computer science. Likewise, "embodiment" has obvious philosophical and even theological valences, but it takes on new

significance when juxtaposed with the concept of the "virtual" as it has come to be understood in digital culture. And, as the title of the volume suggests and as several contributors demonstrate, the notion of "code" has currency in both the human sciences and computer science. These and other traveling concepts are used to establish common ground for cross-disciplinary conversation and to clarify key differences. As they migrate from one field to another, they inspire and provoke new lines of thought and more effective forms of expression.

The book is divided into four sections, with an interlude in the middle and an epilogue at the end. Each section concludes with two responses, and here too the goal has been to promote cross-disciplinary conversation: scholars and artists respond to IT specialists and vice versa. Respondents were asked to regard the essays in their section as a set, with the intention of encouraging them to highlight common themes. Beyond that, however, they were given free rein, and so there is considerable variety in approach, tone, and length. Like the epilogue, the interlude effectively responds to all of the essays. This contribution, by game designer and design theorist Eric Zimmerman, takes the form of an original game, called *Figment*. As Zimmerman notes, *Figment* is not an argument to be analyzed but a game to be played, with all the constraint and freedom that attend such structured play. As the reader—or rather, the player—will discover, this game does not only radicalize the notion of traveling concepts and playfully engage with the ideal of cross-disciplinary dialogue; it also reflects the habits of thought and expression that have developed in an age of electronic cut-and-paste, wikis, and trackback protocols.

Switching Codes is thus designed to exemplify the kind of conversation it seeks to facilitate and promote. To understand how digital technology is transforming thought and practice in the humanities and the arts, it is necessary to cultivate cross-cultural communication, to establish points of reference, and to develop a shared vocabulary. Given the globalized and decentralized nature of digital culture, this cannot be mandated from the top down, as it were, but must be cobbled together from the bottom up and on the fly. The intention here is not to compile an authoritative survey—truly a quixotic endeavor in such a rapidly changing landscape—but to model and catalyze a conversation. Alan Liu's response to the first section of the book is exemplary in this respect, as he calls attention to important and relevant issues left unaddressed by the primary essayists. It also bears emphasizing that the contributors are, for the most part, actively engaged in projects that integrate digital technology and the humanities or the arts. The goal in producing this book has been to fos-

ter an exchange that draws on that concrete, hands-on experience, in all its particularity and diversity, while also addressing matters of common interest and concern. The grouping of the essays, moreover, while drawing attention to certain clusters of issues, does not embody strong claims about the division of the material, and the four-part structure is not meant to obscure the many links between contributions in different sections.

Surveying the volume as a whole, several themes seem particularly salient. To start with, it is evident that in the field of what has been called the "digital humanities," the effort to develop ways of amassing data and making it widely available over the Internet has been terrifically successful. As a result, scholars are, now more than ever, confronted with the challenge of ordering vast quantities of information. How will the information be organized, filtered, and made meaningful? What will count as authoritative and how will authority be established? How much of information processing can be automated, and what is gained or lost in that automation? These and related issues are addressed from both practical and theoretical perspectives in the pages that follow. While the contributors reach no unanimous conclusions, there is a shared sense of the shape and urgency of the questions.

No less profound in its effect has been the shift in recent years toward collaborative and collective modes of working in scholarship, the arts, and culture generally. Many of the authors here address this development in one way or another: we read of scholarship becoming less of an individual, more of a social, activity; of "open scholarly communities on the web"; of the effort to leverage the knowledge of social networks; of interactive cinema and "cumulative creativity." As becomes evident in these essays, this trend has implications as much for the understanding of what constitutes "a work" (of scholarship, of art) as it does for the conception of social organization. One contribution proposes that the task of the contemporary artist is to articulate and give meaning to these "new modalities of 'being' in this world." From the evidence on view in the present volume, this task is shared by theorist and scholar, as they contemplate an intellectual and artistic culture increasingly constituted by networked collaboration.

It is perhaps inevitable that a book focusing on the impact of digital technology will, at some deep level, raise questions about the status of human being in the world. In a traditional conception of human being stretching back to Aristotle, the human is located between the bestial and the divine. In modernity that traditional notion has been challenged from both sides; the line separating human from animal has become ever more difficult to draw, while

at the same time the divine has for many ceased to be a relevant category for philosophical thought. While these two categories, conceived as sub- and supra-human respectively, have certainly not disappeared from the discourse, the present age demands that we add a fourth term to the Aristotelian triad. Now we must also consider the being of humans relative to the being of machines. This concern surfaces in various contexts throughout *Switching Codes*: in Paolo D'Iorio and Michele Barbera's dialogue about the design of a humanities research infrastructure; in Jean-Gabriel Ganascia's inquiry into the possibility of making "creative machines" by simulating "essential unpredictability" on "finite state automatons"; in Albert Borgmann's argument that the human "immersion in reality" cannot ultimately be encoded or simulated; in Bruno Latour and Adam Lowe's reconsideration of the status of originality in the reception of artworks; in the account of Jeffrey Shaw's attempts to engineer interactions between human beings and machines, where machines are said to "determine our spatial formations" and even to behave as "autonomous agents"; and in George Quasha's discussion of Gary Hill's work, where the key question is how "what emerges in the electronic space takes on life and speaks for itself." As noted above, Ian Foster suggests in his piece that the power of automated computation may in certain respects change "what it means to be human." This possibility—both a promise and a threat—is clearly on the minds of many contributors to *Switching Codes*.

The impact of new information technologies has been felt nowhere more acutely than in the world of publishing. While it is no longer in vogue to predict the "end of the book," the future of the traditional codex remains a matter of considerable speculation among those who write on technology and culture. It is yet another peculiarity of the present volume that we have chosen to publish on paper a work dedicated to digital technology, new media, and the virtual world. We have done so in part because we believe that the traditional codex nurtures modes of thought and being that are increasingly rare in our time. *Festina lente*—the proverb that the great Renaissance publisher Aldus Manutius chose for his imprint—is now, more than ever, the most fitting motto for book culture. To make haste slowly means to cultivate the habits of mind and hand that attend the writing, publishing, and reading of books.

Switching Codes, moreover, is designed to prompt reflection on this venerable medium. *Figment*, the game at the center of the book, draws attention to the materiality of the codex, calling for the use of playing cards, ink on paper, that can be snipped out of the pages of this volume. Alan Liu, in his response to Mark Stefik, maintains that the "logical modularity" of the lat-

ter's text, which is the default mode of writing for electronic publication but not for the traditional book, reflects and reinforces a set of convictions about how thought is communicated and meaning established in the digital sphere. Other contributors follow the conventions of traditional essay writing, which is a substantially different kind of discourse. D'Iorio and Barbera deviously subvert this distinction by simulating (or, who knows?, simply reproducing) a Skype chat and putting that forward for print publication. The crowning irony here, as Liu observes in his response, is that their contribution deliberately recalls one of the oldest modes of philosophical writing, the Platonic dialogue, a form that itself marked the transition from oral to written culture. We need only look to the critique of writing in Plato's *Phaedrus* to see why that revolution too may well have been regarded by some as the best of times and the worst of times.

And so we return to our antihero, the protagonist of the epilogue. The book in which he lives is—another irony here—replete with an everyday kind of heroism. Most of the contributors to this volume work daily on conceiving, building, using, and evaluating the complex conglomerations that structure the future world Powers postulates. By and large, these contributors portray their work in terms of opportunities, discoveries, and achievements. The scope of ambition and ability manifest in these pages is nothing short of breathtaking, and the frank enthusiasm buoys the spirit. Yet the novelist sounds a note of caution. Our hope is that *Switching Codes* may stimulate and contribute to a conversation marked equally by caution and enthusiasm.

Thomas Bartscherer

0

> Philosophy is not only a form of knowledge; it is also an expression of cultures.
> Richard McKeon (1952)

The essays in *Switching Codes* constitute not only an exchange between individuals but also a coming together of cultures—the scholarly and creative cultures of computing, the humanities, and the creative arts. The volume builds a conversation between these cultures, introducing those in information technologies who are conceiving of electronic tools and environments to those in the humanities and arts who use digital technologies, often in ways