

Intelligent Systems Reference Library 241

Anthony L. Brooks *Editor*

# Creating Digitally

Shifting Boundaries: Arts and  
Technologies—Contemporary  
Applications and Concepts

 Springer


Anthony L. Brooks  
Editor

# Creating Digitally

Shifting Boundaries: Arts  
and Technologies—Contemporary  
Applications and Concepts

 Springer

*Editor*

Anthony L. Brooks   
CREATE—Section for Media Technology  
Campus Aalborg (Human Machine  
Interaction/The Center for Applied  
Game Research)  
Department of Architecture, Design  
and Media Technology; The Technical  
Faculty of IT and Design  
Aalborg University  
Aalborg, Denmark

ISSN 1868-4394                      ISSN 1868-4408 (electronic)  
Intelligent Systems Reference Library  
ISBN 978-3-031-31359-2              ISBN 978-3-031-31360-8 (eBook)  
<https://doi.org/10.1007/978-3-031-31360-8>

© The Editor(s) (if applicable) and The Author(s), under exclusive license to Springer Nature  
Switzerland AG 2023

Chapter 7 is licensed under the terms of the Creative Commons Attribution 4.0 International License  
(<http://creativecommons.org/licenses/by/4.0/>). For further details see license information in the chapter.

This work is subject to copyright. All rights are solely and exclusively licensed by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors, and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Switzerland AG  
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland



---

# Contents

<b>1</b>	<b>New Media Arts—The Thinking Space for Digitality</b> .....	<b>1</b>
	Monika Fleischmann and Wolfgang Strauss	
1.1	Emphasis .....	1
1.2	ART + COM—An Interdisciplinary Media Lab in West-Berlin (1987–1992) .....	2
1.2.1	Home of the Brain (1990–91)—Philosophers Houses .....	3
1.3	VisWiz—Visual Wizzards at the GMD: The German National Research Center for Information Technology (1992–95) .....	6
1.3.1	Liquid Views (1992)—Narcissus’ Digital Mirror. Ovid’s Metamorphosis as a Real-Time Wave Algorithm .....	7
1.3.2	Responsive Workbench (1993)—Thinking with Your Hand .....	10
1.3.3	The Virtual Balance (1995)—Looking with Your Feet .....	11
1.3.4	Virtual Striptease—First Networked Virtual Studio TV Production (1995) .....	12
1.4	MARS—the Media Arts Research Studies at GMD (1995–2001) and at Fraunhofer (2001–2012) .....	12
1.4.1	Netzspannung.org—One of the First Media Art Online Archives (1998–2010) .....	14
1.4.2	Faces of the Archive .....	19
1.4.3	Semantic Map—A Navigation System for the Data Space (1999–2002) .....	19
1.4.4	MediaFlow—Thoughts in the Flow (2005) .....	21
1.4.5	Digital Sparks Matrix (2001–08) on the Web and on PointScreen (1996–2002) .....	23
1.4.6	Energy Passages—A Public Thinking Space (2004) .....	26
1.5	Digitality for Good or Bad .....	30

<b>2</b>	<b>Pick My Brain: Thoughts on Anatomical Representations of the Human Inner Body from the Renaissance, Baroque Paintings, and Book Illustrations of the Modern Age to Current Medical Imaging Visualizations</b> .....	33
	Danne Ojeda	
2.1	Act 1. Pictorial Bodies: Anatomy Lesson’s <i>Mise-en-Scènes</i> .....	33
2.2	Act 2. Paper Bodies: The Body-Corpse Unbound .....	37
2.3	Act 3. A Portrait in Absence: Pieter Claesz’s <i>Vanitas Still Life</i> (Figure 2.6) .....	43
2.4	Coda. ‘Bodies Without Organs’, or Another (Book) Anatomy Lesson .....	46
	2.4.1 Recollections .....	46
	2.4.2 To <i>Image</i> and the Self-imaginary .....	47
	2.4.3 Paper Sculptures and the <i>Vanitas</i> Series .....	50
	2.4.4 A Portrait in Absence .....	51
	References .....	57
<b>3</b>	<b>A Framework of Networked Art as a Diagram that is an Image as a Map that is a Plan and that is a Space as a Territory</b> .....	59
	Garrett Lynch IRL	
3.1	How Did I Get Where? .....	59
3.2	And from There? .....	61
3.3	Wayfinding .....	65
3.4	“I Looked, and, Behold, a New World!” [34] .....	69
3.5	“A Map <i>Is Not</i> the Territory It Represents” [40] .....	74
	References .....	77
<b>4</b>	<b>Exercising Digitally: A Multi-Perspective Analysis of Exergames for Physical Activity and Health Promotion</b> .....	79
	Lisa Röglin, Anna Lisa Martin-Niedecken, and Sascha Ketelhut	
4.1	A New Approach to Physical Activity and Health Promotion? .....	80
4.2	History of Exergaming: A Brief Overview of Products and Developers .....	83
	4.2.1 Trial and Error .....	83
	4.2.2 “Gamification” Versus “Sportification” .....	84
4.3	Status Quo: A Clustering Approach to Current Exergaming Products .....	86
	4.3.1 Console-Based Exergaming .....	86
	4.3.2 Virtual Reality (VR)-Based Exergaming .....	88
	4.3.3 Cube-Based Exergaming .....	89
	4.3.4 Smartphone-Based or Mobile Device-Based Exergaming .....	90





Contents		xiii
4.3.5	Ergometer-Based Exergames .....	91
4.3.6	Wall-Based Exergames .....	92
4.3.7	Exergaming Room Concepts .....	93
4.4	Potential Effects of Exergaming .....	94
4.4.1	Exercise Intensity and Energy Expenditure .....	94
4.4.2	Enjoyment .....	96
4.4.3	Health-Related Parameters .....	96
4.4.4	Exergaming and Cognitive Performance .....	98
4.4.5	Limitations of Current Literature .....	98
4.4.6	Conclusion .....	99
4.5	Considerations for the Design of Exergames .....	100
4.6	Summary and Future Directions .....	103
4.6.1	In a Nutshell .....	103
4.6.2	Future Directions .....	104
4.6.3	Trends: Exercising in the Metaverse for a Healthy (Real)-Life? .....	105
	References .....	106
<b>5</b>	<b>Close Encounters of the Immersive Kind: Embodied Fundamentals and Future Directions of Affective Virtual Reality (VR) Design .....</b>	<b>117</b>
	<b>Kate Gwynne</b>	
5.1	Introduction .....	118
5.1.1	Affect and the Future of Virtual Reality Design .....	118
5.2	Embodied Fundamentals of VR Narrative Design .....	123
5.2.1	Research Methodology: Tuning into My Intuitive First-Person Perspective .....	124
5.2.2	Findings: Proposing an Embodiment Grammar .....	125
5.3	The Encounter State as Pivotal to VR Design .....	131
5.3.1	Framing Encounters Through Dialogic Possibilities .....	132
5.3.2	Structuring Encounters Through Performative and Ludic Techniques .....	138
5.3.3	Choreographing Encounters to Generate Character Embodiment .....	143
5.3.4	VR Narrative Design Contributions to Conceptualisations of Presence, Immersion and Embodiment .....	156
5.4	Conclusion: The Future of VR Design .....	157
5.4.1	The Future of VR Design .....	157
5.4.2	Conclusion .....	159
	References .....	159



<b>6</b>	<b>Creating Digitally: Computer Films/Screenlife/Zoom</b>	163
	Gregory Dolgoplov	
6.1	Introduction	163
6.2	Screenlife Origins	165
6.3	From Desktop to #Screenlife	168
6.4	Zoom Films	171
6.5	<i>#Sidiadoma</i> [7]	173
6.6	<i>Searching</i> [25]	176
6.7	Conclusion	179
	References	180
<b>7</b>	<b>Designing Interrogative Robot Theater: A Robot Who Won't Take No for an Answer</b>	183
	Sahar Sajadieh and Hannen Wolfe	
7.1	A Theoretical Framework	184
7.2	Robot Theater: A New or Old Practice?	185
7.2.1	Robot Theater and Human Robot Interaction	186
7.2.2	Robotic Performances and Performers	186
7.3	Interrogative Robot Theater: A Practice-Based Approach from Character Design to Staging	188
7.3.1	Staging/Blocking: Interaction Design (Director's Role)	189
7.3.2	Building a Character: Character Design (Actor's Role)	191
7.3.3	Script Writing: Dialogue Design (Playwright's Role)	192
7.4	Research Methodology Implemented: <i>Come Hither to Me!</i>	193
7.4.1	Character Design: ROVERita	194
7.4.2	Interaction Design (with Space and Audience): Staging and Designing Interactivity	199
7.4.3	Dialogue Design: Playwriting + Dramaturgy	203
7.5	An Epilogue	206
7.5.1	Interrogative Design and Robot Forum Theater	207
7.5.2	A Double Negative Identity of a Robotic Performer	208
	References	208
<b>8</b>	<b>Actor-Flower-Mesh-Work: Making Environments Together</b>	213
	Rocio von Jungenfeld and Dave Murray-Rust	
8.1	Introduction	213
8.1.1	The Lichtsuchende	215
8.2	Starting to Make <i>Things</i>	216
8.2.1	Becoming a Thing	217
8.3	Material Qualities, Performances, Flows and Mattering	219
8.3.1	Different Things	222
8.4	Things and Environments	225

8.5	Actors at Work: ANT Briefly Unpacked .....	228
8.6	The Active <i>Mesh</i> at Work .....	231
8.6.1	Ingold's Lines in the Meshwork .....	234
8.6.2	Latour's Actors in the Network .....	236
8.7	Bringing Things Together .....	237
	References .....	239
<b>9</b>	<b>Generative Video Art</b> .....	241
	Pedro Alves da Veiga	
9.1	Introduction .....	241
9.2	Roots .....	243
9.3	Process .....	247
9.3.1	Vocabulary Identification .....	248
9.3.2	Structuring Device .....	251
9.3.3	Recomposition and Amplification .....	255
9.3.4	Event Detection .....	257
9.4	Poetics .....	258
9.5	Conclusion .....	263
	References .....	264
<b>10</b>	<b>A Guide to Evaluating the Experience of Media and Arts</b>	
	<b>Technology</b> .....	267
	Nick Bryan-Kinns and Courtney N. Reed	
10.1	Introduction .....	268
10.1.1	Principles of Quality Research .....	268
10.1.2	HCI, UX, and Interactive Arts .....	269
10.2	Types of MAT Study .....	270
10.2.1	Example Proof-of-Concept Studies .....	271
10.2.2	Comparative Studies .....	274
10.2.3	From Proof-of-Concept to Comparative Study: The Chaos Bells .....	277
10.3	Designing a MAT Study .....	278
10.3.1	Choosing a Study Type .....	279
10.3.2	Designing the MAT Itself .....	280
10.4	Conducting and Reporting Your MAT Study .....	281
10.4.1	Section: Background .....	281
10.4.2	Section: Research Questions .....	282
10.4.3	Section: Study Methodology .....	283
10.4.4	Section: Data Analysis .....	291
10.4.5	Section: Results .....	293
10.4.6	Section: Discussion .....	297
10.4.7	Other Presentation Components .....	298
10.5	Conclusion .....	298
	References .....	299

Contents	xvii
12.6 Evaluation and Feedback .....	351
12.6.1 Development Process and Expert Input .....	351
12.6.2 Evaluation of Use in Care Facilities .....	353
12.6.3 Positive Feedback .....	355
12.6.4 Challenges and Improvements .....	356
12.7 Conclusion .....	357
References .....	358
<b>13 Extended Digital Musical Instruments to Empower Well-Being Through Creativity .....</b>	<b>365</b>
Elena Partesotti	
13.1 Extended Digital Musical Instruments .....	365
13.1.1 Music Therapy and the Mirroring Phase .....	367
13.1.2 EDMIs with Therapeutic Purposes .....	369
13.1.3 Embodiment, the Environment and EDMIs .....	378
13.1.4 Sensorimotor Contingencies, Creativity and Sensory Integration .....	379
13.1.5 BehCreative .....	388
13.1.6 Phases of the User's Creative Involvement Within an EDMI .....	392
13.1.7 Future Perspectives .....	393
13.2 Note .....	395
References .....	395
<b>14 The Evolution of the Virtual Production Studio as a Game Changer in Filmmaking .....</b>	<b>403</b>
Cinzia Cremona and Manolya Kavakli	
14.1 Introduction .....	404
14.2 A Brief History of Composite Images .....	407
14.3 The Evolution of Game Engines .....	409
14.4 A Brief History of the Virtual Camera .....	412
14.5 The Performance of Machinima .....	414
14.6 From Front Projection to LED Volume .....	415
14.7 A Brief History of the Virtual Production Studio .....	416
14.8 Key Technological Components of a Virtual Production Studio .....	418
14.9 The Virtual Production Studio and Qualitative Shifts in Filmmaking .....	421
14.10 Conclusions .....	424
14.11 Domains that Require Further Investigation .....	425
References .....	426



<b>11</b>	<b><i>haptic</i> HONGI: Reflections on Collaboration in the Transdisciplinary Creation of an AR Artwork</b>	301
	Mairi Gunn, Angus Campbell, Mark Billingham, Wendy Lawn, Prasanth Sasikumar, and Sachith Muthukumarana	
11.1	Introduction	302
11.2	Background and Motivation	302
11.3	The <i>haptic</i> HONGI Experience	303
11.3.1	The Technology Behind <i>haptic</i> HONGI	305
11.4	User Feedback from the Experience	307
11.4.1	Quantitative Assessment	307
11.4.2	Qualitative Assessment—A Discursive Approach	308
11.4.3	Māori Responses	309
11.4.4	Immigrant Responses	310
11.5	Reflections on Design	311
11.5.1	Intention: What’s a Discursive Designer to Do?	312
11.5.2	Understanding: What’s a Discursive Designer to Know?	313
11.5.3	Message: What’s a Discursive Designer to Say?	315
11.5.4	Scenario: How Does a Discursive Designer Set the Stage for Discourse?	317
11.5.5	Artifact: What’s a Discursive Designer to Make?	317
11.5.6	Audience: To Whom Does a Discursive Designer Speak?	320
11.5.7	Context: How Does a Discursive Designer Disseminate?	320
11.5.8	Interaction: How Does a Discursive Designer Connect?	321
11.5.9	Impact: What Effect Can a Discursive Designer Have?	323
11.6	Lessons Learned	324
11.7	Conclusion and Directions for Future Work	327
	References	329
<b>12</b>	<b>Connecting Past and Present Through a Multisensory Toolkit—A Non-pharmacological Intervention for People Living with Dementia</b>	331
	Esther Olorunda and Rachel McCrindle	
12.1	Introduction	332
12.2	Impact of Dementia	332
12.3	Reminiscence Therapy	333
12.4	Multisensory Stimulation	334
12.5	The AMuSED Toolkit	336
12.5.1	Themes	338
12.5.2	Stimulation	344
12.5.3	Activity Booklet and Prompt Questions	350



<b>15</b>	<b>Interactive Film: Forking Paths to a Complete Audiovisual Experience</b>	431
	Bruno Mendes da Silva	
15.1	A Brief Preamble—From Prehistory to the Present Day	431
15.2	The Forking Paths	435
15.3	Models and Levels of Film Interactivity	438
15.4	Results	439
15.5	A Proposal to a Final Path of <i>Walking on Ice</i>	441
	References	442
<b>16</b>	<b>Design for Science: Proposing an Interactive Circular 2-Level Algorithm</b>	445
	Bruno Azevedo, Pedro Branco, and Francisco Cunha	
16.1	Introduction	446
16.2	Circular Layouts: Definition and Contextualization	450
16.3	Designing and Implementing a 2-Level Circular Layout	461
16.3.1	Interaction Techniques	465
16.4	Preliminary Results	465
16.5	Conclusion and Future Work	468
	References	469
<b>17</b>	<b>Children’s Generative Play with a Combination of Analogue and Digital Resources</b>	473
	Eva Brooks and Anders Kalsgaard Møller	
17.1	Introduction	473
17.2	Generative Play—Playing with Meaning Potentials	475
17.3	Multimodal Communication and Representation	476
17.4	Creating Cross-Over Modalities—A Case Study	477
17.5	Analysis	479
17.5.1	Excerpt 1 (June 19th, 2019)	480
17.5.2	Excerpt 2 (December 12th, 2018)	482
17.5.3	Excerpt 3 (December 12th, 2018)	484
17.6	Discussion	485
17.6.1	Action Potentials	485
17.6.2	Characteristics of Analogue and Digital Resources	486
17.6.3	Aligning Design Goal, Resource, and Play Actions	487
17.7	Conclusion	487
	References	488





<b>18 Empowering Creativity and Feedback: Lessons Learned from the Development of an App to Assist Game-Based Learning Activities</b> .....	491
Maria Helena Reis, Ana Margarida Almeida, and Catarina Lelis	
18.1 Introduction .....	492
18.2 Octalysis Framework .....	493
18.2.1 Empowerment of Creativity and Feedback .....	495
18.3 A Research Roadmap Based on a Communicative Design Paradigm .....	499
18.4 An App for Supporting the Selection of Educational Games .....	502
18.5 Final Considerations .....	507
References .....	508
<b>19 Virtual Reality Prosumers on YouTube and Their Motivation on Digital Design Students</b> .....	511
Alejandra Lucía De La Torre Rodríguez, Ramón Iván Barraza Castillo, David Cortés Sáenz, Tayde Edith Mancillas Trejo, and Anahí Solís Chávez	
19.1 Introduction .....	512
19.2 Motivation .....	513
19.3 Problem Statement .....	516
19.4 Literature Review .....	516
19.5 Materials and Methods .....	518
19.6 Procedure .....	518
19.6.1 Video Game Design Survey .....	519
19.6.2 VR Technology Survey .....	520
19.7 Results and Discussion .....	520
19.8 Conclusions .....	524
References .....	525
<b>20 Design of a Bespoke Web-Based 3D Virtual Venue and Video Streaming Event Platform</b> .....	527
Ramón Iván Barraza Castillo, Alejandra Lucía De La Torre Rodríguez, Iris Iddaly Méndez-Gurrola, and Anahí Solís Chávez	
20.1 Introduction .....	528
20.2 Literature Review .....	529
20.2.1 Moving Towards the Metaverse .....	529
20.2.2 From Virtual Tours to Virtual Campuses and Beyond .....	531
20.3 Proposed Methodology .....	533
20.3.1 Interior Design .....	534
20.3.2 2D/3D Floor Plan .....	535
20.3.3 Mood Boards, Furniture, and Lighting .....	535
20.3.4 Information Technology .....	536

20.3.5	Digital Design .....	538
20.3.6	Graphic Design .....	542
20.4	Results .....	543
20.5	Conclusion .....	545
	References .....	546

## Chapter 19

# Virtual Reality Prosumers on YouTube and Their Motivation on Digital Design Students



Alejandra Lucía De La Torre Rodríguez, Ramón Iván Barraza Castillo, David Cortés Sáenz, Tayde Edith Mancillas Trejo, and Anahí Solís Chávez

**Abstract** There is no denying that in our digital culture, prosumers have an impact on brand positioning and purchase decisions with their audience. However, the actions and discourse of the prosumers can also exert other types of motivation in the academic field. Thus, we wanted to assess if the YouTube prosumer movement has had any impact in the desire of digital design students towards video game development. In this chapter we first introduce the concept of motivation, the different types, and how it relates to the design process. Though motivation theory is not the focus of the research, it is relevant to better understand what the driving force behind the students' video game projects proposals is. Through the literature review we explore the work of authors on the topic of impact on motivation prosumers have had on students. Finally, we present the results of two surveys conducted amongst students of the Digital Design for Interactive Media (DDIM) undergraduate program. Subjects had to have some video game and Virtual Reality (VR) design and development experience to participate in this research. The first survey laid foundation about students' motivation in relation to YouTube prosumers. Second survey focused on finding if the opinion of prosumers regarding VR, motivated the students in pursuing school projects that use this technology. Both questionnaires were based on a five-point Likert scale and dichotomous questions. The information gathered, allowed a

---

A. L. De La Torre Rodríguez · R. I. Barraza Castillo (✉) · D. Cortés Sáenz · T. E. Mancillas Trejo · A. Solís Chávez  
Architecture, Design and Art Institute, Ciudad Juárez Autonomous University, Ciudad Juárez, Chihuahua, México  
e-mail: [ramon.barraza@uacj.mx](mailto:ramon.barraza@uacj.mx)

A. L. De La Torre Rodríguez  
e-mail: [lucia.delatorre@uacj.mx](mailto:lucia.delatorre@uacj.mx)

D. Cortés Sáenz  
e-mail: [david.cortes@uacj.mx](mailto:david.cortes@uacj.mx)

T. E. Mancillas Trejo  
e-mail: [tayde.mancillas@uacj.mx](mailto:tayde.mancillas@uacj.mx)

A. Solís Chávez  
e-mail: [asolis@uacj.mx](mailto:asolis@uacj.mx)