

Contents

Part I The Story of Virtual Worlds

1	TÜV NORD IN 3D: Avatars at Work—From Second Life to the Web 3D	3
	Frank Boerger and Hanno Tietgens	
1.1	Introduction	3
1.1.1	World Wide Change	3
1.1.2	The Rise of Social Media and Multi-User Online Games	4
1.1.3	Second Life: Virtual World, Real Hype	5
1.2	TÜV NORD IN 3D: Exploring the Future	10
1.2.1	Exploring 3D	11
1.2.1.1	The Avatar as an Interaction Interface	11
1.2.1.2	Interaction with the 3D Space	12
1.2.1.3	Interaction with 3D Technology and Content Creation Tools	13
1.2.1.4	Interaction with Objects and Media	16
1.2.1.5	Interaction with Others	19
1.2.2	Adding Value in 3D	21
1.2.2.1	ROI Within 1 Year: Virtual Events at the 3D Auditorium	23
1.2.2.2	Visualization and Simulation in 3D	26
1.2.2.3	Game-Based Learning	27
1.2.2.4	Positive Feedback, Serious Doubts	33
1.2.3	Expanding Expertise: Beyond Second Life	34
1.2.3.1	Other Virtual World Platforms and Toolkits	35
1.2.3.2	Digital 3D: Old Questions, New Answers	43
1.2.3.3	TÜV NORD: Backup in 3D	49
1.2.3.4	3D Standards: Being Set	50
1.2.3.5	TÜV NORD: Expansion in 3D	50
1.2.3.6	Overcoming Limitations	51
1.2.4	Going Public: Sharing Results	53

1.3	Lessons Learnt	55
1.3.1	Evaluation	55
1.3.2	Outlook	56
	References	57
2	How Linden Lab Built a Virtual World for Business and Education	63
	Jean Miller	
2.1	How Linden Lab Built a Virtual World for Business and Education	63
2.2	To Build a World	64
2.3	To Build a Nation	66
2.4	To Build a Democracy	68
2.5	To Support Education	71
2.6	To Support Business	73
2.7	To Support Direction	75
2.8	To Support the People	77
2.9	To Build, To Support	79
2.10	Afterword	81
	References	82
3	3D3C Real Virtual Worlds 2010: Definition and Visions for Researchers	85
	Yesha Sivan	
3.1	Motivation: Preparing for a Long-Term Paradigm Shift	85
3.2	Background: Second Life as a Case of a Real Virtual World	86
3.3	A Formal Definition: 3D + Community, Creation, and Commerce	89
3.4	What Will Drive Virtual Worlds into the Future?	92
3.5	Visions	93
3.6	Conclusion for Research	95
	References	98
 Part II Social Dimension in the Use of Virtual Worlds		
4	Second Life as a Social Environment	103
	Tanja Adamus, Axel Nattland, and Lars Schlenker	
4.1	Introduction: The Social Significance of Virtual Worlds	103
4.2	Constructing Sociality: Second Life as a Meeting Place for an Online Degree Program	104
4.3	Constructing Space: Analyzing the Influence of Design on Social Processes	107
4.4	Constructing Identity: Using Avatars and Role-Playing to Experience Social Roles	112
4.5	Conclusion	113
	References	114

5	Social Navigation for Learning in Immersive Worlds	119
	Jon Dron	
5.1	Introduction	119
5.1.1	Soft Machines	119
5.1.2	Soft and Hard Technologies	120
5.2	Collectives in Nature	121
5.2.1	Direct Collectives	121
5.2.2	Stigmergic Collectives	122
5.2.3	A Third Kind of Collective	123
5.3	The Wisdom of Crowds and the Stupidity of Mobs: Seeking Educational Value in the Collective	124
5.3.1	Collectives in Non-immersive Virtual Spaces	125
5.3.2	Collectives in Immersive Environments	126
5.3.3	Immersive Worlds and Educational Collective: A Gap in the Literature	127
5.4	Potential Approaches for Mediated Collectives in Immersive Environment Literature	128
5.4.1	Aggregations and Averages	128
5.4.2	Item-Based, Human-Based Collaborative Filters	128
5.4.3	Network Analysis	129
5.4.4	Reputation Models	130
5.5	Potential Interfaces for Mediated Collectives	130
5.5.1	Leaving the 3D Interface	130
5.5.2	Landscape Shaping	130
5.5.3	Highlighting	131
5.5.4	Explicit Signs	131
5.5.5	Filters	132
5.5.6	Beyond the Visual	132
5.6	Conclusions	132
	References	133

Part III Collaboration

6	3D Digital Environments for Virtual Teams	139
	Michael A. Schuler	
6.1	Introduction	139
6.2	Virtual Teams	141
6.2.1	Globalization and Virtual Teams	141
6.2.2	Virtual Team Management	142
6.2.3	Communication, Socializing, and Collaboration	144
6.2.4	Advanced ICT for Virtual Team	146
6.2.5	Enhance Virtual Teams by Modern ICT	149
6.3	3D Project Environment	150
6.3.1	3D Spaces	150
6.3.2	Real-World Concerns in Virtuality	152

6.3.3	Collaboration	153
6.3.4	Socializing and Communication	154
6.4	Use Cases	155
6.4.1	Creating an Environment for Process Simulation	155
6.4.2	Virtual Teamwork	156
6.4.3	Advantages and Risks	158
6.5	Discussion and Outlook	159
	References	160
7	Second Life as a Virtual Lab Environment	165
	Dennis Maciuszek, Alke Martens, Ulrike Lucke, Raphael Zender, and Thomas Keil	
7.1	Introduction	165
7.2	Inquiry Learning and Virtual Labs	166
7.3	A Cognitive Modelling Lab in Second Life	169
7.3.1	Course Content	170
7.3.2	Technology Setup	171
7.4	Experiences and Results	174
7.4.1	The Exercises	175
7.4.2	Group Meetings	177
7.4.3	Student Projects	182
7.5	Discussion	192
	References	197

Part IV Learning and Education

8	Taking the Distance Out of Learning for Students Through a Virtual World	205
	Sue Gregory	
8.1	Introduction	205
8.2	Background	206
8.2.1	Virtual Worlds as a Teaching and Learning Space	
	Using Adult Learning Theories	208
8.2.2	State of Play of Virtual Worlds	209
8.2.3	Engagement	211
8.2.4	Distance Learners	211
8.2.5	Methodology	212
	8.2.5.1 Quantitative Data Collection	214
	8.2.5.2 Qualitative Data Collection	214
8.2.6	Results and Findings	214
	8.2.6.1 Results Through Learning Activities	215
	8.2.6.2 Analysis of In-World Sessions	215
	8.2.6.3 Age of Students	215
	8.2.6.4 Comparison of Grades	219
	8.2.6.5 Comparison of Mode of Study	219
	8.2.6.6 Communication Tool	220

8.2.6.7	Measuring Engagement in Second Life	221
8.2.6.8	Behavioural Engagement (Observable Actions or Performance)	223
8.3	Conclusion and the Future	224
	References	225
9	Pedagogical and Psychological Impacts of Teaching and Learning in Virtual Realities	233
	Andreas Hebbel-Seeger	
9.1	“Constructing” Knowledge in 3D-Space	233
9.2	“Playfully” Gaining Knowledge in 3D-Space	239
9.3	Motivation for Gaining Knowledge in 3D-Space	241
9.4	Conclusion and Outlook	245
	References	246
10	Virtual World-Building: Implications for Education and Training	251
	Suzanne Aurilio	
10.1	Introduction	251
10.2	Background	251
10.2.1	Learning Online	252
10.2.2	Adults as Learners	252
10.2.3	Conclusion	254
10.3	The Study	254
10.4	Findings	255
10.4.1	World-Building Tools, Techniques, and Practices	255
10.4.1.1	Tools	255
10.4.1.2	Techniques	255
10.4.1.3	Practices	255
10.4.2	Home Is Where Inspiration Resides	256
10.4.2.1	Having Creative Control	256
10.4.3	Having Creative Structure	261
10.5	Discussion	263
10.6	Implications	265
10.6.1	Business as Usual with Minor Changes	265
10.6.2	Business Unusual: Major Changes	267
10.7	Conclusion	268
	References	268
11	Game-Based Elements to Upgrade Bots to Non-Player Characters in Support of Educators	273
	Lincoln C. Wood and Torsten Reinert	
11.1	Introduction	273
11.2	Virtual Worlds in Education	274
11.2.1	Gamification of the Virtual Worlds Concept	275
11.2.2	The Evolution of Bots	277
11.2.3	Intensity of Interaction	279

11.3	Framework Elements	284
11.3.1	Authenticity	284
11.3.2	Gamification Elements	285
11.3.3	Technological Progression	288
11.3.4	Framework Development	289
11.4	Conclusion	290
	References	291
12	Collaborative Learning in Virtual Environments	295
	Dennis Schäffer and Jörg Heeren	
12.1	Introduction	295
12.2	Aims and Genesis of the Project	297
12.3	Underlying Theoretical Assumptions	298
12.4	Deploying Second Life as Learning Environment	302
12.4.1	Fields of Action	302
12.4.2	Learning Spaces of EL3	306
12.4.2.1	Colosseum	307
12.4.2.2	Skycenter	307
12.4.2.3	Conference Room	308
12.4.2.4	Holodeck	309
12.4.2.5	Representative Area	310
12.4.2.6	Counselling and Coaching Area	310
12.4.2.7	Informal Areas	312
12.4.3	Learning Tools Adapted by EL3	312
12.4.3.1	Sloodle	312
12.4.3.2	Teacher Tools for Work and Collaboration	313
12.4.3.3	Visualisation Tools and Presentations	314
12.5	Challenges and Perspectives	315
	References	317
	Part V Use-cases and Scenarios of Integration	
13	Business Meets Community in Virtual Berlin	323
	Jan Northoff	
13.1	Introduction	323
13.2	At the Beginning	324
13.3	The Idea of the Virtual City	325
13.4	BERLINin3D.com	326
13.5	Electro Smog	328
13.6	Event Hosting, Dance, and Chat	328
13.7	Marketing Cooperations	329
13.8	Supporting Art and Culture	330
13.9	Art in Second Life	330
13.10	Religion	331
13.11	Real-Time Movie Production: Machinima	332
13.12	Science	334

13.13	The Confusing Avatar	335
13.14	Problems in Virtual Worlds	335
13.14.1	Technical Problems	335
13.14.2	Immersion	335
13.14.3	Drama	336
13.14.4	Griefing	337
13.14.5	Community Work	337
13.14.6	Marketing	338
13.14.7	Investment and Communication	339
13.14.8	LindeX Exchange	339
13.14.9	Choosing the Right Platform	339
13.14.10	Virtual Goods and Services	340
13.14.11	Value Creation in Virtual Worlds	343
13.14.12	Server Hosting and Providing Knowledge	343
13.15	3D Design, 3D Printing and Prototyping	343
13.16	Meetings, Conferences and Live Streaming	345
13.17	E-Learning, Simulations and Serious Games	346
13.18	Future	347
13.18.1	Universal Tool	347
13.18.2	3D Online Profile	347
13.18.3	OpenSim	347
13.18.4	Hyper grid	348
13.19	Conclusion: Web 3D	348
	References	348

Part VI Development Issues and Implementation Benefits

14	Supporting Diverse Needs of Learning Groups: Towards Highly Flexible Learning Settings in Collaborative 3D Virtual Environments	355
	Christian Gütl, Vanessa Chang, and Stefan Freudenthaler	
14.1	Introduction	355
14.2	Background	357
14.2.1	Collaborative Learning Activities	357
14.2.2	Technology Support in Collaborative Learning	358
14.2.3	3D Virtual Environments and Collaborative Learning ..	360
14.2.4	The Need for More Flexibility in Collaborative Virtual Learning Environments	361
14.3	Related Work	361
14.4	Motivation and Requirements	364
14.5	Prototype Development	365
14.5.1	Conceptual Architecture	365
14.5.2	“Off-World” Development	365
14.5.3	“In-World” Development	368
14.5.4	Cases	370

14.6	Lesson Learned	370
14.7	Summary and Future Work	373
	References	374
15	Transforming Ideas to Innovations: A Methodology for 3D Systems Development	379
	Carl Dreher, Torsten Reiners, and Heinz Dreher	
15.1	Introduction	379
15.1.1	Socio-Technological Evolution	379
15.1.2	The Role of Research Commercialisation	380
15.2	Digital Ecosystems	381
15.2.1	Introduction in 3D Digital Ecosystems	382
15.2.2	Synopsis of Benefits and Limitations	383
15.2.3	A Research Commercialisation Case Study	384
15.3	A Methodology to Support Users in 3D Digital Ecosystems System Development	387
15.3.1	Methodology for Avatar-Based Development of Systems	388
15.3.2	The Six Stages of MEADS: An Overview	390
15.3.2.1	Stage 1	391
15.3.2.2	Stage 2	393
15.3.2.3	Stage 3	395
15.3.2.4	Stage 4	396
15.3.2.5	Stage 5	397
15.3.2.6	Stage 6	398
15.3.3	Proposed Applications and Benefits of MEADS	399
15.4	The Future for Innovative 3DDE Research, Development, and Commercialisation	401
	References	403
	Index	409

Synthetic Worlds

Emerging Technologies in Education and Economics

Hebbel-Seeger, A.; Reiners, T.; Schäffer, D. (Eds.)

2014, XX, 415 p. 179 illus., 161 illus. in color.,

Hardcover

ISBN: 978-1-4614-6285-9