Southern New Hampshire University

SABBATICAL PROJECT REPORT – PART II

Serious Games:
The Confluence of Virtual Reality, Simulation & Modeling,
and Immersive Education

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APPENDICES

I. Game journals & magazines

Scholarly Journals

<u>Print</u>

Association for Learning Technology Journal (ALT-J)
(1993 -)
Published by Routledge and the Association for Learning Technology
ISSN: 0968-7769 (print)
ISSN: 1741-1629 (online)
http://www.tandf.co.uk/journals/titles/09687769.asp

British Journal of Educational Technology (BJET)
(1970 -)
Published by Blackwell and the British Educational Communications and Technology Agency
ISSN: 0007-1013
http://www.wiley.com/bw/journal.asp?ref=0007-1013

Computer Animation and Virtual Worlds
(1990 -)
Published by Wiley
ISSN: 1546-4261
http://www3.interscience.wiley.com/journal/106562739/home

Computers and Composition: An International Journal
(1983 -)
Published by Elsevier and Ohio State University
ISSN: 8755-46150
http://computersandcomposition.osu.edu/
http://www.bgsu.edu/cconline/ (online companion)
Note: Volume 25, Issue 3 is themed on video games.

Computers and Education
(1977 -)
Published by Elsevier
ISSN: 0360-1315
http://www.elsevier.com/locate/compedu

Computers in Human Behavior
(1985 -)
Published by Elsevier
ISSN: 0747-5632
http://www.elsevier.com/locate/comphumbeh

Convergence: The International Journal of Research into New Media Technologies
(1995 -)
Sage Publications
ISSN: 1354-8565 (print)
ISSN: 1748-7382 (online)
http://con.sagepub.com/

CyberPsychology & Behavior: The impact of the internet, multimedia and virtual reality on behavior and society
(1998 -)
Published by Mary Ann Liebert
ISSN: 1094-9313
http://www.liebertonline.com/loi/cpb

Games and Culture: A Journal of Interactive Media
(2006 -)
Sage Publications
ISSN: 1555-4120 (print)
ISSN: 1555-4139 (online)
http://gac.sagepub.com/

Interacting with Computers
(1989 -)
Published by Elsevier
ISSN: 0953-5438
http://www.elsevier.com/locate/intcom

International Digital Media and Arts Journal
(2004 -)
Published by International Digital Media and Arts Association
ISSN: 1554-0405
http://www.idmaa.org/journal/

International Journal of Computer Games Technology
(2008 -)
Hindawi Publishing Corporation
ISSN: 1687-7047 (print)
ISSN: 1687-7055 (online)
http://www.hindawi.com/journals/ijcgt/

International Journal of Gaming and Computer-Mediated Simulations
(2009 -)
Published by IGI Publications and Information Resources Management Association
ISSN: 1942-3888 (print)
ISSN: 1942-3896 (online)
http://www.igi-global.com/journals/details.asp?id=8005

International Journal of Human-Computer Studies
(1994 -)
Published by Academic Press
ISSN: 1071-5819
http://www.elsevier.com/locate/ijhcs
Note: Formerly known as International Journal of Man-Machine Studies (1969 – 1993)

Journal of Educational Technology & Society
(2003 -)
Published by International Forum of Educational Technology & Society
ISSN: 1176-3647 (print)
ISSN: 1436-4522 (online)
http://www.ifets.info/

Journal of Game Development
(2004 – 2008)
Published by Charles River Media
ISSN: 1543-9399
http://www.jogd.com

Simulation
(1963 -)
Sage Publications
ISSN: 0037-5497
http://sim.sage.com/

Simulation & Gaming: An Interdisciplinary Journal of Theory, Practice, and Research
(1990 -)
Sage Publications
ISSN: 1046-8781 (print)
ISSN: 1552-826X (online)
http://www.unice.fr/sg/

Transactions on Edutainment
(2008 -)
Published by Springer
ISSN: 1867-7207
http://www.springer.com/computer/lncs/transactions+edutainment/

Virtual Reality
(1995 -)
ISSN: 1359-4338 (print)
ISSN: 1434-9957 (online)
Published by Springer
http://www.springerlink.com/content/108194/

Online only

e-Learning
(2004 -)
Published by Symposium Journals
ISSN: 1741-8887
http://www.wwwords.co.uk/ELEA/

Electronic Journal of e-Learning
(2003 -)
Published by Academic Conferences Limited
ISSN: 1479-4403
http://www.ejel.org/

Eludamos: Journal for Computer Game Culture
(2007 -)
Published by University of Göttingen
ISSN unavailable
http://www.eludamos.org

First Monday
(1996 -)
Published by University of Illinois at Chicago University Library
ISSN: 1396-0466
http://firstmonday.org/

Game Studies: The International Journal of Computer Game Research
(2001 -)
Publisher unavailable
ISSN: 1604-7982
www.gamestudies.org

Innovate: Journal of Online Education
(2004 -)
Published by Fischler School of Education and Human Services at Nova Southeastern University
ISSN: 1552-3233
http://innovateonline.info/
International Journal of Intelligent Games & Simulation
(2002 -)
Published by SCS Europe and University of Wolverhampton
ISSN: 1477-2043
http://www.scit.wlv.ac.uk/~cm1822/ijigs.htm

Journal of Artificial Societies and Social Simulation (JASSS)
(1998 -)
Published by SimSoc Consortium
ISSN: 1460-7425
http://jasss.soc.surrey.ac.uk/JASSS.html
Journal of Computer-Mediated Communication
(1995 -)
Published by Wiley-Blackwell and International Communication Association
ISSN: 1083-6101
http://www.wiley.com/bw/journal.asp?ref=1083-6101

Journal of Virtual Reality and Broadcasting
(2004 -)
Published by HBZ
ISSN: 1860-2037
http://www.jvrb.org/

Loading…
(2007 -)
Published by Canadian Game Studies Association
ISSN unavailable
http://journals.sfu.ca/loading/

Trade or Non-scholarly Publications

Print

Computer Games
(1983 -)
Carnegie Publications
ISSN: 0748-4461
URL Unavailable

Computer Gaming World
(1981 – 2006)
Published by Ziff Davis Media
ISSN: 0744-6667
http://cgw.vintagegaming.org/

Computer and Video Games
(1981 – 2004)
Published by Future
ISSN: 0261-3697
http://www.computerandvideogames.com/

CyberEdge Journal: The World's Leading Newsletter of Virtual Reality
(1991 – 1997)
Published by the Delaney Companies
ISSN: 1061-3099
http://www.cyberedge.com/info_r_a%2Bp03.html

Develop Magazine
(2005 -)
Published by Intentmedia
ISSN unavailable
http://www.developmag.com/

Edge Magazine
(1993 -)
Published by Future US
ISSN: 1350-1593
http://www.edge-online.com/

EDUCAUSE Review
(2000 -)
Published by EDUCAUSE
ISSN: 1527-6619
http://connect.educause.edu/er

Electronic Games
(1981 – 1985)
Reese Publications
ISSN: 0730-6687
URL Unavailable

Electronic Gaming Monthly
(1989 – 2009)
Published by Ziff Davis Media
ISSN: 1058-918X
http://www.1up.com/do/pubs?did=2

Games Analyst
(2002 – 2003)
Published by Informa Media Group
ISSN: 1476-7759
URL Unavailable

Game Developer
(1994 -)
Published by United Business Media
ISSN: 1073-922X
http://www.gdmag.com/

Game Informer
(1991 -)
Published by GameStop Corporation
ISSN: 1067-6392
http://www.gameinformer.com/

Games for Windows: The Official Magazine
(2006 – 2008)
Published by Ziff Davis Media
ISSN: 1933-6160
http://gfw.1up.com/

GamePro
(1989 -)
Published by IDG Entertainment
ISSN: 1042-8658
http://www.gamepro.com/

GameNow
(2001 -)
Published by Ziff Davis Media
ISSN: 1537-2553
URL unavailable

GameWeek Magazine
(1995 – 2003)
Published by Cyberactive Media Group
ISSN: 1097-394X
http://www.gignews.com/

MCV: The Market for Home Computing and Video Games
(1998 -)
Published by Intentmedia
ISSN: 1469-4832
http://www.mcvuk.com/

Next Generation
(1995 – 2002)
Published by Imagine Media
ISSN: 1078-9693
http://www.next-gen.biz/

Nintendo Power
(1988 -)
Published by Future
ISSN: 1041-9551
http://www.nintendopower.com/

NGamer
Formerly NGC Magazine (1997 – 2006)
(2006 -)
Published by Future
ISSN: 1751-3910
http://www.ngamer.co.uk

Official Xbox Magazine
(2000 -)
Published by Future
ISSN: 1534-7850
http://www.oxmonline.com/

PC Gamer
(1994 -)
Published by Future
ISSN: 1080-4471
http://www.pcgamer.com/

Play (US)
(1999 -)
Fusion Publishing
ISSN: 1537-7539
http://www.playmagazine.com/

Play (UK)
(1995 -)
Imagine Publishing
ISSN: 1747-7859
http://www.play-mag.co.uk/

PlayStation: The Official Magazine
(2007 -)
Published by Future
ISSN: 1940-0721
http://www.psmonline.com/

T.H.E. Journal: Technological Horizons in Education
(1972 -)
Published by 1105 Media
ISSN: 0192-592X
http://www.thejournal.com/

Total PC Gaming
(2007 -)
Imagine Publishing
ISSN: 1755-7623
http://www.totalpcgaming.com/

<u>Online/other websites that may be useful</u>

Game Research
http://game-research.com/

Digiplay Initiative: Understanding Digital Games
http://www.digiplay.info/

The Escapist
http://www.escapistmagazine.com/

Flipcode: Daily Game Development News and Resources
http://www.flipcode.com/

Terra Nova
http://terranova.blogs.com/

II.   Game Conferences & proceedings

Serious Games

Annual Apply Serious Games and Virtual Worlds Expo and Forum
UK Trade and Investment
South East Media Network
Gamesindustry.biz
KnowledgeWorks Foundation
Advanced Institute of Management Research
http://www.applyseriousgames.com/

Baltimore Modeling, Simulation and Serious Games Day
http://www.seriousgamesbaltimore.com/

CGAMES: International Conference on Computer Games: AI, Animation, Mobile, Interactive
Multimedia, Educational & Serious Games
http://www.cgames.org/

Edutainment International Conference on E-Learning and Games
Athabasca University (Canada)
iCore Circle of Research Excellence
NAIT
http://www.ask4research.info/edutainment/2009/

eGames: Serious Play Conference
Knowledge Oasis Muscat
http://www.seriousgamessource.com/item.php?story=22553 (No official link)

European Conference on Games Based Learning (ECGBL)
Academic Conferences International
http://academic-conferences.org/ecgbl/ecgbl2009/ecgbl09-home.htm

FuturePlay
Algoma University (Canada)
University of Ontario Institute of Technology
http://www.futureplay.org/

Game-Based Learning
Advantage West Midlands
http://www.gamebasedlearning2009.com/

Games Education and Enterprise Conference (GEEC)
http://geec09.ning.com/

Games for Change Annual Festival
Games for Change
http://www.gamesforchange.org/fest2009

Games for Health Conference
Robert Wood Johnson Foundation
http://www.gamesforhealth.org/

Games, Learning and Society Conference
University of Wisconsin-Madison School of Education
Academic ADL Co-Lab
http://www.glsconference.org/

Game-On
EUROSIS (European Multidisciplinary Society for Modeling and Simulation Technology)
http://www.eurosis.org/cms/index.php?q=node/37#GAMEON

International Conference on Artificial Reality and Telexistence (ICAT)
http://www.vrsj.org/ic-at/ICAT2008/

International Conference on Fun and Games
Eindhoven University of Technology (Netherlands)
IOP (Innovation-Oriented Research Programs, Netherlands)
SenterNovem
http://www.fng2008.org/

Learning and Entertainment Evolution Forum
Harrisburg University
http://www.harrisburgu.net/LEEF2009/

Learning Through Games
Society for the Advancement of Games and Simulations in Education and Training (SAGSET)
http://www.simulations.co.uk/sagset/

Learning with Games
The PRIME Project
http://www.lg2007.org/

Nordic Conference of Serious Games
University of Jyväskylä Agora Game Lab (AGL)
Institute for Educational Research
http://ktl.jyu.fi/ktl/nsg-conference/

Serious Games Canada
Montreal International Games Summit
http://www.sijm.ca/2009/en-serious-games.html

Serious Games Conference
Nord Media
German Trade Association of Interactive Entertainment Software (BIU)
http://www.seriousgamesconference.de/index.php?id=1&L=2

Serious Games Interactive Café Workshop
(as part of European Conference on Technology Enhanced Learning)
Institut Telecom
http://www.seriousgames.it/ectel09/

Serious Games on the Move
Anglia Ruskin University (England)
http://www.inspire.anglia.ac.uk/serious/

Serious Games Summit
Game Developers Conference
http://www.gdconf.com/conference/sgs.html

Serious Virtual Worlds Conference
Serious Games Institute
http://www.seriousvirtualworlds.net/

Triangle Game Conference Serious Game Sessions
Triangle Game Initiative
http://www.trianglegameconference.com/apps/schedule/track/4

VS-Games: Games and Virtual Worlds for Serious Applications
IEEE
Coventry University
BECTA
Serious Games Institute
http://www.vs-games.org.uk/

X Media Lab Serious Games Conference
X Media Lab
http://www.xmedialab.com/?q=node/273

Simulation

Asian Simulation Technology Conference (ASTEC)
EUROSIS (European Multidisciplinary Society for Modeling and Simulation Technology)
http://www.eurosis.org/cms/index.php?q=taxonomy/term/19

Asia Simulation Conference
Japanese Society for Simulation Technology
http://www.jsst.jp/e/asc2009/

European Conference on Modeling and Simulation (ECMS)
SCS Europe
IEEE Germany Section
ASIM - German Speaking Simulation Society
Eurosim Federation of European Simulation Societies
Chinese Association for System Simulation
Japanese Society for Simulation Technology
Latvian Simulation Society
Polish Society of Computer
Turkish Simulation Society
http://www.scs-europe.net/conf/ecms2009/

European Simulation and Modelling Conference (ESM)
EUROSIS (European Multidisciplinary Society for Modeling and Simulation Technology)
http://www.eurosis.org/cms/index.php?q=taxonomy/term/21

The Food and Nutrition Simulation Conference (FOODSIM)
EUROSIS (European Multidisciplinary Society for Modeling and Simulation Technology)
http://www.eurosis.org/cms/index.php?q=taxonomy/term/23

High Performance Computing & Simulation Conference (HPCS)
IEEE Germany
ASIM - German Speaking Simulation Society
Eurosim Federation of European Simulation Societies
Chinese Association for System Simulation
Japanese Society for Simulation Technology
Latvian Simulation Society
Polish Society of Computer
Turkish Simulation Society
University of Leipzig
http://cisedu.us/cis/hpcs/09/main/callForPapers.jsp

IEEE Virtual Reality Conference
IEEE
http://conferences.computer.org/vr/

Industrial Simulation Conference (ISC)
EUROSIS (European Multidisciplinary Society for Modeling and Simulation Technology)
Hungarian Academy of Sciences Atomic Energy Research Institute
Institution of Chemical Engineers
http://www.eurosis.org/cms/index.php?q=taxonomy/term/26

International Conference on Applied Simulation and Modeling (ASM)

International Association of Science and Technology for Development (IASTED)
World Modelling and Simulation Forum (WMSF)
http://iasted.org/conferences/home-682.html

International Conference on Modeling and Simulation (ICMS)
World Academy of Science, Engineering, and Technology
http://www.waset.org/wcset09/tokyo/icms/

International Conference on Modelling, Simulation and Identification (MSI)
International Association of Science and Technology for Development (IASTED)
World Modelling and Simulation Forum (WMSF)
http://iasted.org/conferences/home-659.html

International Simulation Multi-conference (ISMc)
Society for Modeling and Simulation International (SCS)
http://www.scs.org/confernc/summersim/summersim09/cfp/summersim09.htm

SimTecT Simulation Conference and Exhibition
CAE Australia
http://www.siaa.asn.au/simtect/2009/2009.htm

Spring Simulation Multi-conference (SpringSim)
Society for Modeling and Simulation International (SCS)
http://www.scs.org/confernc/springsim/springsim09/springsim09.htm
http://www.scs.org/confernc/springsim/springsim10/springsim10.htm

Summer Computer Simulation Conference (SCSC)
Society for Modeling and Simulation International (SCS)
http://www.eng.auburn.edu/~yilmaz/SCSC09-CFP.htm

Western Simulation Multiconference (WesternSim)
Society for Modeling and Simulation International (SCS)
http://www.scs.org/confernc/westernsim/

Winter Simulation Conference
http://www.wintersim.org/

Immersive Education

3D Training, Learning, and Collaboration Conference
Engage Digital Media
http://www.3dtlc.com/

Defence Academies & Colleges International e-Learning Conference (DACeL)
Defence Academies & Colleges (Australia)
http://www.unsw.adfa.edu.au/units/ets/dacel_conference/

ED-MEDIA: World Conference on Educational Multimedia, Hypermedia &
Telecommunications
Association for the Advancement of Computing in Education (AACE).
http://aace.org/conf/edmedia/

E-Learn: World Conference on E-Learning in Corporate, Government, Healthcare, and Higher
Education
Association for the Advancement of Computing in Education (AACE)
International Journal on E-Learning
http://aace.org/conf/elearn/

Global Learn 2010: Global Conference on Learning and Technology
Association for the Advancement of Computing in Education (AACE).
http://blogs.aace.org/aace/2009/02/10/global-learn-asia-pacific-2010/

Immersive Education Initiative Summit
http://mediagrid.org/summit/

Interacting with Immersive Worlds
Brock University Interactive Arts and Science Program (Canada)
http://www.brocku.ca/iasc/immersiveworlds/

International Conference on Computers and Advanced Technology in Education (CATE)
International Association of Science and Technology for Development (IASTED)
World Modelling and Simulation Forum (WMSF)
http://iasted.org/conferences/home-672.html

International Conference on Computer and Instructional Technologies (ICCIT)
World Academy of Science, Engineering, and Technology
http://www.waset.org/conferences/2009/amsterdam/iccit/

International Conference on Computer Supported Collaborative Learning
International Society of the Learning Sciences (ISLS)
http://www.isls.org/cscl2009/

International Conference on e-Education and e-Learning (ICEEEL)
World Academy of Science, Engineering, and Technology
http://www.waset.org/conferences/2009/bangkok/iceeel/

International Conference on Educational Technology (ICET)
World Academy of Science, Engineering, and Technology
http://www.waset.org/conferences/2009/bangkok/icet/

International Conference on Education and Information Technologies (ICEIT)
World Academy of Science, Engineering, and Technology
http://www.waset.org/conferences/2009/bangkok/iceit/

International Conference on Technology and Education (ICTE)
World Academy of Science, Engineering, and Technology
http://www.waset.org/conferences/2009/bangkok/icte/

Interservice/Industry Training, Simulation, and Education Conference
National Defense Industrial Association
http://www.iitsec.org/

Media Grid (2009). Immersive Education Platforms. Retrieved August 21, 2009, from
http://www.mediagrid.org/

National Educational Computing Conference
International Society for Technology in Education (ISTE)
http://center.uoregon.edu/ISTE/NECC2009/

Plymouth e-Learning Conference
University of Plymouth
http://www2.plymouth.ac.uk/e-learning/

Second Life Education Community Conference
(as part of the Official Second Life Community Convention)
The Future United, Inc.
http://sledcc.wikispaces.com/

Conference Proceedings

Proceedings of CGAMES
Published by University of Wolverhampton, School of Computing and Information Technology
http://www.cgames.org/

CGAIDE 2004: 5th International Conference on Computer Games, Artificial Intelligence,
Design and Education
8-10 November 2004 (Reading, UK)
ISBN: 0-9549016-0-6 / 978-0-9549016-0-8

CGAIMS 2005: 6th International Conference on Computer Games, AI and Mobile Systems
27-30 July 2005 (Louisville, Kentucky, USA)
ISBN: 0-9549016-1-6

CGAMES 2005: 7th International Conference on Computer Games: Artificial Intelligence,
Animation, Mobile, Educational and Serious Games
28-30 November 2005 (Angoulême, France)
ISBN: 0-9549016-2-6

CGAMES 2006: 8th International Conference on Computer Games, AI and Mobile Systems
24-27 July 2006 (Louisville, Kentucky, USA)
ISBN: 0-9549016-1-4 / 978-09549016-1-5

CGAMES 2006: 9th International Conference on Computer Games: Artificial Intelligence and Mobile Systems
22-24 November 2006 (Dublin, Ireland)
ISBN: 0-9549016-2-2 / 978-0-9549016-2-2

CGAMES 2007: 10th International Conference on Computer Games: AI, Animation, Mobile, Educational and Serious Games
25-28 July 2007 (Louisville, Kentucky, USA)
ISBN: 0-9549016-3-0 / 978-0-9549016-3-9

CGAMES 2007: 11th International Conference on Computer Games: AI, Animation, Mobile, Educational and Serious Games
21-23 November 2007 (La Rochelle, France)
ISBN: 978-0-9549016-4-6

Computer and Games International Conference
Published by Springer
Full-text of individual articles available from specified URLs but requires login

CG '98: First International Conference
Tsukuba, Japan, November 11-12, 1998
ISBN: 3540657665 / 9783540657668
http://www.springerlink.com/content/a78ru09nlwje/

CG2000: Second International Conference
Hamamatsu, Japan, October 26-28, 2000
ISBN: 3540430806 / 9783540430803
http://www.springerlink.com/content/2nj4ctrwax3c/

CG2002: Third International Conference
Edmonton, Canada, July 25-27, 2002
ISBN: 3540205454 / 9783540205456
http://www.springerlink.com/content/fl2ptmxaxukl/

CG2004: 4th International Conference
Ramat-Gan, Israel, July 5-7, 2004
ISBN: 3540324887 / 9783540324881
http://springerlink.metapress.com/content/h16t71hn2471/

CG2006: 5th International Conference
Turin, Italy, May 29-31, 2006
ISBN: 9783540755371 / 3540755373
http://www.springerlink.com/content/w111046p6h1l/

CG2008: 6th International Conference
Beijing, China, September 29 - October 1, 2008
ISBN: 9783540876083 / 3540876081
http://www.springerlink.com/content/n75710235711/

Computer Games & Allied Technology 08 (CGAT 08)
Animation, Multimedia, IPTV & Edutainment Proceedings
Singapore, 2008
Published by Research Publishing Services
ISBN: 9789810806941 / 9810806949
http://www.cgames.com.sg/cgat08/index.htm

DiGRA (Digital Games Research Association)
Published by DiGRA
Full-text of individual articles from each conference are available from the DiGRA Digital
Library at http://www.digra.org/dl

Computer Games and Digital Cultures Conference (2002)
Tampere, Finland
ISBN: 9514453719 / 9789514453717

Level Up (DiGRA 2003)
First International Digital Games Research Association Conference
Utrecht, Netherlands
ISBN: 9039335508 / 9789039335505

Changing Views: Worlds in Play (DiGRA 2005)
Second International Digital Games Research Association Conference
June 16 - 20, 2005
Vancouver, Canada
ISBN unavailable

Situated Play (DiGRA 2007)
Third Digital Games Research Association International Conference
Tokyo, Japan
ISBN unavailable

Edutainment: Technologies for e-Learning and Digital Entertainment
Published by Springer

First international conference, Edutainment 2006
Hangzhou, China, April 16-19, 2006
ISBN 3540334238 / 9783540334231

Second international conference, Edutainment 2007
Hong Kong, China, June 11-13, 2007
ISBN 9783540730101 / 3540730109

Third international conference, Edutainment 2008
Nanjing, China, June 25-27, 2008
ISBN 9783540697343 / 3540697349

Fun and Games: Second International Conference
Eindhoven, Netherlands, October 20-21, 2008
Published by Springer
ISBN: 9783540883210 / 3540883215
Online version accessible through:
http://www.springerlink.com/content/978-3-540-88321-0/

Proceedings of the 2007 Conference on Future Play
Toronto, Canada, November 14 - 17, 2007
Published by ACM
ISBN: 978-1-59593-943-2
Full-text available from http://portal.acm.org/citation.cfm?id=1328202 *(Requires login)*

GAMEON and GAMEON-NA (North America) Conference Proceedings
Published by EUROSIS (The European Multidisciplinary Society for Modeling and Simulation Technology)
http://www.eurosis.org/cms/?q=taxonomy/term/31

GAMEON'2003 (Covers Development, Storytelling and Natural Language Processing, Games Engines, Modelling and Animation, Learning Technologies, Agent Ontology and Architecture, 3-D Graphics, Agent Behaviours, Algorithms for Routing and Flight Simulation, Mobile and Wireless Games, Go)
November 19-23, 2003, IEE, London, United Kingdom
ISBN 90-77381-05-8

GAMEON'2004 (Covers Game AI, AIBO Based Applications, Game Animation and Simulation, Virtual Environments and Game Space, Game Design and Education)
November 25-27, 2004, Het Pand, Ghent, Belgium
ISBN 90-77381-15-5

GAMEON'2005 (Covers Simulation and AI, Synthetic Characters and Agents, Game Physics and Facial Animation, Game Design, Online Games Research)
November 24-25, 2005, De Montfort University, Leicester, United Kingdom
ISBN 90-77381-23-6

GAMEON'2006 (Covers Graphics and Rendering, AI in Games, Gaming with Robots, Mobile Gaming)
November 29 - December 1, 2006, TU Braunschweig, Braunschweig, Germany
ISBN 978-90-77381-31-1

GAMEON'2007 (Covers Game Methodology, Game AI, Art Design and Graphics, Mobile Gaming, Online Gaming and Security, Education, Serious Gaming)
November 20 - 22, 2007, University of Bologna, Bologna, Italy
ISBN 978-90-77381-31-1

GAMEON'2008 (Covers Game Methodology, Game Graphics, AI Behaviour, Game AI Analysis, AI Programming, Neural Networks and Agent Based Simulation, Team Building, Education and Social Networks)
November 17 - 19, 2008, UPV, Valencia, Spain
ISBN 978-90-77381-45-8

GAMEON-NA'2005 (Covers Gamebots and RTS Games)
August 22-23, 2005, McGill University, Montreal, Canada
ISBN 90-77381-19-8

GAMEON-NA'2006 (Covers Game AI, Game Design, Education and Art)
September 19-20, 2006, NPS, Monterey, USA
ISBN 90-77381-29-5

GAMEON-NA'2007 (Covers Simulated Card and Board Games, Game Agents, Game Actors, MMO Modelling, AI Techniques in Gaming and Simulation in Game Design)
September 10-12, 2007, University of Florida, Gainesville, USA
ISBN 97-89077381-35-9

GAMEON-NA'2008 (Covers Path Finding and Maps, Content Adjustment, Interaction and Immersive Gameplay, Game Scripting and Game AI)
August 13-15, 2008, McGill University, Montreal, Canada
ISBN 978-90-77381-35-9

Game Developers Conference Proceedings
Archive of speaker slides and papers available from
http://www.gamasutra.com/features/gdcarchive/

Joint International Conference on CyberGames and Interactive Entertainment 2006 (CGIE2006)
Perth, Australia, 4-6 December 2006
Published by School of Information Technology, Murdoch University
ISBN: 86905-902-5
Full-text of individual articles available from http://portal.acm.org/citation.cfm?id=1231894
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Ludic Moments: Computer Games For The Time Being
Sydney, Australia, May 2003
Published by Macquarie University Media Department
ISBN: 1920781013 / 9781920781019

Serious Games on the Move
Cambridge, England, 23-24 June 2008
Published by Springer
ISBN: 9783211094174 / 3211094172
http://www.inspire.anglia.ac.uk/serious/index.html

Proceedings of the 2006 ACM SIGCHI International Conference on Advances in Computer
Entertainment Technology
Hollywood, California, 2006
Published by ACM
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Full-text of individual articles available from http://portal.acm.org/toc.cfm?id=1178823
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Proceedings of the ACM Symposium on Virtual Reality Software and Technology (VSRT)
Published by ACM (Association for Computing Machinery)
Full-text of individual articles from each proceeding are available from the ACM Digital Library
at http://portal.acm.org/ (Go to ACM Digital Library > Browse Proceedings > VSRT) (Requires
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1995 (San Diego, California, United States)
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2001 (Paderbon, Germany)
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ISBN: 1-58113-468-1

III.   Virtual worlds

Social Virtual Worlds

3B
http://www.3b.net/
(USA) Provides a platform that enables users to socialize, shop and browse within a 3D environment. Enables users to hang out and chat in customizable 3D spaces called villages which are built to display their MySpace pages, their friends' pages, their favorite websites, their Flickr photos and more. In addition to creating a personalized avatar which they can dress and design, the user can personalize their village by choosing a 3D theme for their space and changing some of the elements inside the village.

3D City
http://www.3d-city.net/
(USA) 3D City is an online virtual world that can be used as a 3D avatar chat room to complement any existing website that has members. A paid service for website creators.

Action AllStars
http://www.actionallstars.com/
(USA) A browser-based, sports-themed virtual world designed for ages 6-to-14. Along with the National Basketball Association (NBA) and Major League Baseball Advanced Media (MLB.com), the Action AllStars team strives to provide a Fun, Free and Safe entertainment destination where users ("Athletes") of all ages can play games, interact with friends, customize their Avatar and Home Turf with official NBA and MLB gear, and participate in daily contests based on real-world scores and stats.

Adventure Rock
http://www.bbc.co.uk/cbbc/adventurerock/
(UK) A virtual online world for children created by the BBC developed for a UK audience of children aged between 6-12 years old. The emphasis on the system is on safety and responsibility, with no chatrooms (avatars cannot interact with one another) or the financial aspects available in other online worlds such as Second Life.

Agape World Fellowship
http://www.agapeworldfellowship.org/
A Christian world ministry and fellowship where users can come to worship and pray to the Lord, as well as chat with others, build, and have fun. Christian service and Bible studies are provided regularly.

Ai Sp@ce
http://aisp.jp/home.html
(Japan) A social world based on three visual novels, where users can interact through avatars with each other and with the heroines of the visual novels. Users live on one of three islands patterned after the worlds featured in the visual novels, connected by a central Akihabara Island where users can gather for chatting and events.

All Girl Arcade
http://www.allgirlarcade.com/
(Canada) A virtual world created for young girls where they can play a variety of games and interact with other users.

Amazing Worlds
http://www.amazingworlds.com/
(USA and Singapore) A 3D online mirror world for people to learn about places and things to do in each country/location. Aims to work with organizations and business partners globally to build the most interactive real mirror image (3D) of the world's interesting places for the Global Audience.

Bailamo
http://www.bailamo.de/
(Germany) A beach-themed social virtual world for adults where users are encouraged to ―flirt‖ with one another.

BarbieGirls
http://www.barbiegirls.com/
(USA) A Flash-based world for girls in their early teens where they can create and decorate their own virtual room, design an online character, play games, earn virtual money, chat, and more.

BaoBao BengBeng
http://www.bb-bb.cn/
(China) Chinese virtual world where users select animal avatars to play online flash games and chat to one another. BaoBao-BengBeng integrates a virtual world with its own microtransactions system -- while the game is free to play without a purchase, a feature code that comes with the plush toy and purchase-able items within the game provide additional content.

Be-Bratz
http://www.be-bratz.com/
(USA) Online world for Girls age 6+, a virtual world where you can play fun games, meet new friends, have your own customizable page, a room to decorate, a pet to play with. Accessible when you buy a Bratz toy.

Beanie Babies
http://www.ty.com/newhome
(USA) Beanie Babies 2.0 combine imaginative play in a virtual world that includes interactive chatting, a gaming atmosphere, and so much more.

Bella Sara
http://www.bellasara.com/
(Denmark/USA/Int'l) Bella Sara™ is a safe, fun-filled magical world of horses and other characters for children ages 5 and up to expand their imaginations. Bella Sara products come with positive messaging and a secret code that expands a child's experience with a virtual online world. By entering these secret codes at BellaSara.com, children can enhance their online and offline experiences with games, activities, and caring for their magical horses.

Blue Mars
http://www.bluemarsonline.com/
(USA) Blue Mars is a free to play massively multiplayer virtual world featuring stunning graphics, realistic characters, and endless social bonding activities. The Blue Mars virtual world is made up of an expanding set of independently operated cities that feature unique themes, activities, and attractions such as shopping, avatar customization, unique personal spaces, and games like dancing, racing, and golf. Cities on Blue Mars are tied together with a unified login system, persistent global Avatar ID, and platform wide participation based reward system that encourages users to explore, play, and make new friends.

CC Metro
http://www.mycoke.com/
(USA) CC Metro is a new 3-D world that's replaced Cokestudios. In here, you can make new friends, chat, play, create, dance, mingle and much more. Must be 13 or older to become a member.

Citypixel
http://www.citypixel.com/
Citypixel is a pixelart-based Internet city. Come lease an apartment, watch a video, play a game, chat with your neighbors, build a profile, post your pix, and look for new art and landmarks.

Cybertown
http://www.cybertown.com/
(USA) Citizens and their online 'avatar' representations can explore the elaborate virtual space to 'see' one another's movements and are able to chat with each other in real time. They have created a virtual society where members must find jobs in order to earn the 'cyber cash' necessary to buy and furnish homes for themselves. Cybertown also provides special programming for its inhabitants through entertainment and educational formats including contests, celebrity chats, parties, live multimedia events, videos, concerts, classes and town meetings.

Cyworld

http://us.cyworld.com/

(South Korea) Cyworld is a whole new way to connect with the people in your world. Here you'll find friends you know, new people to meet, clubs to join and special spaces for your photos, artwork, journals and more. In Cyworld, you can meet up, hang out, play, dream and share your world like never before.

Disney's Toontown Online

http://play.toontown.com/

(USA) Disney's Toontown Online, the first massively multiplayer online game designed specifically for kids and families, is an award-winning, kid-safe, endlessly evolving, and immersive 3-D online world. In Toontown, players, as Toons, join forces to save the world from the invading robot Cogs - humorless business robots who are attempting to turn the colorful, happy world of Toontown into a corporate metropolis.

Dubit

http://www.dubitchat.com/

(United Kingdom) Dubit is an online community created for (and by) UK teenagers. We provide a safe online environment where people can meet, chat, blog & play games.

Frenzoo

http://www.frenzoo.com/

(Hong Kong) Frenzoo is a unique 3D avatar community for fashion and lifestyle. In a safe and friendly environment, ―ztylists" around the world can become budding fashionistas, play dress up games, express their style and create and share unique looks – all within a web browser. Frenzoo helps designers and brands showcase their creations in beautiful, interactive and animated 3D, letting ztylists really get a deep impression on their works.

Gaia Online

http://www.gaiaonline.com/

(USA) Founded in 2003, Gaia Online is the leading online hangout on the web. Gaia provides a fun, social environment that inspires individuality and creativity. With everything from art contests to discussion forums on poetry, politics, celebrities and more, to fully customizable profiles, digital characters and cars, Gaia is a place where teens can create their own space and express their individual style.

Habbo Hotel

http://www.habbo.com/

(Finland) Habbo Hotel is a place where people can create their own Habbos, have fun, hang out, play games, and make friends.

Hana City

http://www.hanacity.com/

(South Korea)

Hipihi

http://www.hipihi.com/

(China) HiPiHi World is a 3D digital world as rich and complex as the real world, and is created, inhabited and owned by its residents. The residents are the Gods of this virtual world; it is a world of limitless possibilities for creativity and self-expression, within a complex social structure and a full functioning economy.

IMVU

http://www.imvu.com/

(USA) Members of IMVU have fun meeting new people with similar interests and expressing themselves through personalized 3D avatars, themed rooms, one-to-one chats, and the creation of new and unique virtual products. With over 1.5 million user-generated virtual items, IMVU offers the world's largest catalog of virtual goods. Revenue is derived from the direct sale of virtual credits, which are used to purchase virtual products such as room decorations, clothing items and hairstyles.

iCitizen

http://www.micazook.com/M_Product.aspx?G=1003

(United Kingdom) Global community of i-citizen allows you to meet new people and make new friends. Make yourself a character and invite one or more of your friends to Paris, New York, London or maybe even Tokyo, go to a café, bar or a cinema and watch a video or even listen to music.

iPart

http://www.ipart.cn/

(China) Committed to the concepts of "youth, creation and innovation". Through the online information platform, it offers web and mobile users various internet services including netizen blogs, photo albums, friendship and dating services, as well as wireless value-added functions. Computer chip maker AMD recently set up a virtual shop here.

Jewel of Indra (Adult Content)

http://www.jewelofindra.net/

(International) Jewel of Indra is the premier Adult Chat and Virtual World, where you can interact with other adults, using animated sexy avatars, customize your home and live in your sexual fantasy world.

Just Leap In

http://www.justleapin.com/

(Canada) Just Leap In is your virtual, 3D home on the Web. It's a place to share your stuff – photos, videos, news, and music — while meeting others who share your interests. In the future, it will make the Web a little more like the real world – and the real world a little more like the Web.

Kaneva

http://www.kaneva.com/

(USA) The World of Kaneva is a free virtual world, where you can make new friends, hang out together, and have fun. A digital metropolis full of cool hangouts, interesting people, and entertainment hot spots, Kaneva's free virtual world offers you an immersive 3D experience where you can play games, shop, or build your dream home. Bring your friends, your favorite videos and music… bring your imagination, and step into our free virtual world, the World of Kaneva.

Kinset

http://www.kinset.com/

(USA) Kinset is for those of us who like to shop. Stroll down an aisle with hundreds of items on display. Pause when something catches your eye. Browse and linger while discovering new things. That's what real shopping is about, and that's what makes Kinset the first online shopping that's truly enjoyable.

Lego Universe

http://universe.lego.com/

(USA) The LEGO Group is developing a new massively multiplayer online game (MMOG) called LEGO Universe. Players in this revolutionary gameworld will experience the fun, creativity and quality of a LEGO product in an awe-inspiring virtual environment.

Lulilab (formerly Playdo)

http://www.lulilab.com/

(USA) Lulilab is a social meeting place for young and creative people. We focus on your creative side and offer a fun place where you can design your own homepage, upload pictures, write blogs, make friends and have lots of fun doing it.

The Mall Plus

http://www.themallplus.com/

(New Zealand) Enhances the online shopping experience by presenting vendors in a virtual 3D mall. Combines the fun of real shopping with the convenience of online shopping.

The Manor

http://www.madwolfsw.com/

(USA) A 2D visual chat experience that offers a choice of virtual online worlds.

MeetMe

http://www.meetme.jp/

(Japan) Online reality simulation game similar to Second Life.

MiniFriday

http://www.minifriday.com/

(Finland) Mini Friday is a small research project on virtual worlds on mobile phones. We are trying to find out if real-time virtual worlds make sense on mobile devices. Mini Friday is a very simple virtual world - a bar and a club with different language versions for now.

Mokitown
http://www.mobile-kids.net/
(Germany) Mokitown is one big chat area. Meet other Mokis from around the world and explore the city with them. Buy a cell phone and you can chat with other Mokis that own a cell phone throughout the city.

Moove
http://www.moove.com/
(Germany) Build your very own free virtual world with 3D chat rooms on your PC. Furnish your virtual 3D rooms, decorate it with your pictures - with Webcam, Voice, full control. Choose your 3D avatar for online chat. Dress up and decorate with ever more free outfits and interior. Match & meet friends for 3D chat with Romance, flirt, hugs, kisses and more...

myMiniLife
http://www.myminilife.com/
(USA) MyMiniLife is a new form of entertainment and social play experience that allows people to express themselves and connect in an artistic and fun way through the online design of their own personal environment. MyMiniLife allows people to expand their life, relax and be creative by designing and decorating their dream surroundings whether it is their everyday house, vacation home, ideal business, log cabin, dorm room, Manhattan loft, Tuscan villa, and more. MyMiniLife allows people to construct and furnish their spaces and homes through stylized economic activity involving the building of properties and neighborhoods, the uploading and selling of useful and fun items, and the buying of objects using MyMiniLife money to decorate their artistic creations.

Novoking
http://www.novoking.com/
(China) Novoking is a 3D virtual world built and owned by its residents.

OurWorld
http://www.ourworld.com/
(USA) FlowPlay has launched ourWorld, an online entertainment destination which aggregates the top online games into a unified experience. Players select from dozens of proven online game titles with genres from puzzle to action and play to win prizes like hair styles, clothing, and furniture. Surrounding this is a rich virtual world with dance clubs, coffee shops, beaches, and shopping venues. Players have their own apartments, pets to raise and quests to perform as they rise through the ranks of the role playing meta game that glues the experience together.

The Palace
http://www.thepalace.com/
(USA) The Palace is a free graphical chat. Create and wear your own picture (avatar). Build your very own chat server. Come be a part of the community!

Papermint
http://www.papermint.com/
(Austria) Papermint is a friendly social networking game. Papermint is a game which thousands of people all over the world can play at the same time. Choose your game character and start your new life in a vast, colorful world.

PlayStation Home
http://www.us.playstation.com/PSN/Home
(USA) Home is a real-time 3D, networked community that serves as a meeting place for PlaySation 3 users from around the world, where they can interact, communicate, join online games, shop, share content and even build their own personal spaces. Home will be available as a free download from the PlayStation and will launch directly from the PS3 system's Home Menu.

Red Light Social Center (Adult Content)
http://www.redlightcenter.com/
(USA)

RipLounge
http://www.riplounge.com/
(USA) RipLounge.com combines the best of social network and 3-D virtual worlds where users can not only create and share their personal profile but also visit virtual social settings (bars, pools, yachts) and interact with other members. RipLounge.com also allows users to instant message with and without video and voice.

Roliana
http://www.roliana.com/
(United Kingdom) Create your own avatar and customize him or her with your choice of clothes, hair styles and other items. To buy clothes you need to earn Gold by participating in the forums and playing games.

Rude Virtual (Adult Content)
http://www.rudevirtual.com/
(USA) A social network for adults only.

RumorFeller
http://www.rumorfeller.com/
RumorFeller is one of the greatest virtual reality environments created ever on the web, and it's all designed, built and created by you! Within seconds of setting foot on RumorFeller you will find a vast, unique land where you can create your own character, meet new friends, and even purchase your own land where you can build whatever you like with our powerful, yet easy to use 3D software. With regular events such as concerts, games and shows, RumorFeller allows you to get involved, meeting new people and exploring other people's creations.

SceneCaster

http://www.scenecaster.com/

(Canada) SceneCaster is a 3D social media application and online community where anyone can visualize their ideas, share them, and make them real. It allows you to create your own 3D spaces and share them with your Facebook and other social networking friends. Choose from millions of 3D objects and textures to personalize your scenes. Add your own photos and link to your favorite YouTube videos and online music. Invite your friends to view or modify your scenes.

Second Life

http://www.secondlife.com/

(USA) Second Life is a virtual world environment inhabited by over 13 million people, and accessible to anyone with a computer and internet connection. The world is populated by avatars, which are 3D representations of their users. By controlling your avatar through your computer keyboard, you can travel to different locations, interact with other avatars and engage in new experiences all in a rich 3D environment.

Small Worlds

http://www.smallworlds.com/

(New Zealand) SmallWorlds is a 3D virtual world that runs inside your web browser. It enables you to build your own room, house, or even your own world, and fill it with a wide variety of items and fun activities.

Splume

http://www.splume.com/

(Japan)

Stagecoach Island (by Wells Fargo)

http://blog.wellsfargo.com/stagecoachisland/

(USA) Stagecoach Island is an online virtual world created by Wells Fargo. You can explore the island and its hidden secrets, connect with friends and make new ones, and at the same time learn smart money management. You can earn virtual money by visiting the Learning Lounge — a virtual Wells Fargo ATM — and answering questions about money management. With our introduction of the building functionality, you can now use what you earn to buy land and start building your dream home. Each new member will be given 5000 "shells" — just enough to start a mortgage.

Taatu

http://www.taatu.com/

(Belgium) Members chat with friends, listen to music, watch videos, play games, meet real-life stars, organize parties and have fun in a graphically rich environment, accessible instantly from any standard web browser. Taatus create their identity by customizing their avatar and their 3D personal space. They generate content and share it with others from their own space. They enjoy an open and direct connection to the Web. 2.0 ecosystem so as to never miss the last buzz. TAATU World is a safe and managed environment. Targeted towards Dutch and French speakers.

There
http://www.there.com/
(USA) There is an online hangout where you can meet friends, play games and explore a 3D virtual world that's yours to help design and build.

Traveler (formerly OnLive! Traveler)
http://www.digitalspace.com/traveler/
(USA) DigitalSpace Traveler® is a unique experience on the Internet, supporting communities of users using their own voices to speak through 3D avatars which lip synch and blend sound together. Traveler creates the experience of a ―cocktail party in Cyberspace‖ and permits up to 16 people in one virtual space to talk or even share music.

TowerChat
http://www.towerchat.com/
(United Kingdom) Create your own world where you can customize the way you look and your own place to meet new friends on-line.

Toyota Metapolis
http://metapolis.toyota.co.jp/about/map.html
(Japan) Created by Toyota, includes a Mall where you can buy and test drive Toyota cars, an event hall for presentations of their latest cars, a museum featuring new developments and older models, among others.

Twinity
http://www.twinity.com/
(Germany) Twinity is a 3D online world that links the real with the virtual world based on realistic replicas of the world‗s most vibrant metropolises in 3D.

uWorld
http://www.uworld3d.com/
(China)

Virtual Ibiza
http://www.virtualibiza.com/
(United Kingdom) VirtualIbiza.com is your gateway to the coolest community on the Web. A 3D world based on the hedonistic and totally fun filled island of Ibiza.

Virtual MTV (or vMTV)
http://www.vmtv.com/
(USA) Virtual MTV is a 3D online social experience where you can live the MTV life with all of your friends. You can create your avatar, design your crib, explore 3D worlds, shop and play fun games.

Virtual Vancouver (Adult Content)
http://www.virtual-vancouver.com/
(Canada) Virtual Vancouver is the Internet‗s most sophisticated and advanced adult virtual reality universe. Our online erotic community site offers users virtual nightclubs, hotels, bars,

movie theaters and stores. In addition, we offer Community Events, such as parties, classes, meeting rooms, live music with dancing and art-gallery openings. These events are broadcast within the online universe. Users also have the ability to put on their own events to real audiences in the Virtual Vancouver Theaters.

Vivaty
http://www.vivaty.com/
(USA) Vivaty Scenes is a web based virtual community where users can personalize their own virtual scene and avatar and socialize with their friends. Vivaty's vision is to make the Immersive Web a reality by transforming the flat web into a more visually rich and expressive experience that amplifies socialization and engagement. The company's end-to-end web platform is designed to enable distributed virtual experiences anywhere on the web.

vLES
http://www.vles.com/
(USA) VLES is a new music discovery community on the web, that is modeled after New York City_s Lower East Side—a Mecca for young bands and music. It_s also where artists, fashion designers, and party promoters mix together in a big network of trendsetting, partying, music-loving euphoria. We found those people, asked for their help, and together we created the Virtual Lower East Side (VLES).

vSide
http://www.vside.com/
(USA) vSide users configure their own avatars, make friends, chat, dance, listen to music, shop for clothing, attend events and parties, create and decorate their own private spaces, and throw their own parties in those spaces, choosing the music, videos, and guest list.

Voodoo Chat
http://www.voodoochat.com/
Voodoo Chat is a free graphical chat community. Using web pages as a backdrop, Voodoo Chat lets you chat with old and new friends in a well-blended environment that lets you feel like you're 'in the room' without taking the emphasis away from chatting.

VZones
http://www.vzones.com/
(USA) When you join the VZones, you become a digital person and meet other people from around the world. You can talk, gesture, walk around and explore...play games, win prizes, buy, sell and just have fun.

Weblin
http://www.weblin.com/
(Germany) Weblin makes you and others on the Web visible as small avatars. There are others on the same page you are on right now. Weblin opens a new and exciting world on every web site.

Weblo
http://www.weblo.com/

(USA) Weblo is a virtual replica of the real world where you can own anything - from your hometown, to your favorite sports stadium, to New York City. Real US dollars are used to buy and sell property.

WeeWorld
http://www.weeworld.com/
(USA) WeeWorld is a social network built for fun where you can meet and interact with WeeMees, invite friends, send messages, play games and create your own online cartoon page.

Whyrobbierocks.com
http://www.whyrobbierocks.com/
(Netherlands) Whyrobbierocks.com (WRR) is an online avatar fashion store for young people who are interested in fashion and lifestyle. Visitors can make an avatar, open a shop and design and/or sell fashion. And everything is free!

Whyville
http://www.whyville.net/
(USA) Whyville is a virtual world where boys and girls from all over the real world come to chat, play, learn, and have fun together. You design your face, earn clams by playing games, hang out at the beach, and go to town events at the Greek Theater. You can start your own business, buy a car and give your friends a ride, or write for the town newspaper.

Xivio
http://www.xivio.com/
(USA) The free 3D Virtual World and Social Network for kids. Create your own Avatar, chat, collect rare items, get an apartment, invite friends. All fun, safe, and free.

YoVille
http://www.yoville.com/
(USA) An application on Facebook and MySpace where users can build, play games, and chat with friends using avatars.

Zanpo
http://www.zanpo.com/
Zanpo is an online game, virtual world, and social network. There are many cities in Zanpo, each with its own unique architecture and community. Build your own virtual world!

Zwinky
http://www.zwinky.com/
(USA) Zwinky is more than just a virtual world; it's a fast-growing online community where social interaction reaches new heights. This Mindspark product encourages users to showcase their individuality by creating distinctive avatars, decorating personal dorm rooms, playing casual games, and connecting with others in the world of Zwinktopia, the center of all the action. Members have access to a wide array of wardrobe and furnishing options; however, users can further enhance their experience by purchasing exclusive clothing, accessories and decor using Zwinktopia's unique online currency, ZBucks.

Closed Social Virtual Worlds

Lively
http://www.lively.com/
(USA) Lively was a network of avatars and virtual rooms created and decorated by its users. Google launched Lively on July 8, 2008 as an experiment in providing people with more ways to express themselves on the Web. Lively's users created thousands of cafes, bars, discos, tropical islands, treehouses, space stations, galleries, bedrooms and more. Lively's users shared their rooms with people from all over the real world, meeting and chatting with each other via their customized avatars.

Educational Virtual Worlds

Arts Metaverse
http://artsmetaverse.arts.ubc.ca/
(Canada) Arts Metaverse, an immersive 3-D virtual learning environment, provides an opportunity for scholars, teachers, students, and interested individuals to create and share their own virtual space with others. Developed by the University of British Columbia's Arts Instructional Support & Information Technology unit, Arts Metaverse is based on the open-source Croquet platform.

Cisco Live Virtual
http://ciscolivevirtual.veplatform.com/
(USA) Serves as a virtual venue that runs in parallel to the annual Cisco Live conference.

Quest Atlantis
http://atlantis.crlt.indiana.edu/
(USA) Quest Atlantis (QA) is an international learning and teaching project that uses a 3D multi-user environment to immerse children, ages 9-16, in educational tasks. QA combines strategies used in the commercial gaming environment with lessons from educational research on learning and motivation.

Shrine Educational Experience (SEE)
http://www.seequmran.net/
(Italy) SEE is a unique educational experience, a bridge between cultures and time: thanks to state-of-the-art technologies, students from all over the world can meet, interact, cooperate in a virtual world! Students of four different schools, aged 12 to 19, meet together in a 3D online virtual environment to learn, play and discuss about cultural issues revolving around the discovery of the Dead Sea Scrolls, 2000-years-old manuscripts written by a Jewish sect who lived in the desert near the Dead Sea, which represent an invaluable source to understand the roots of Western civilization.

ThinknDrinkn?
http://www.thinkndrinkn.com/
(United Kingdom) ThinknDrinkn? is a project designed to raise the issues associated with alcohol abuse in young people and their local communities. Working with 1st year pupils from 2 secondary schools in Renfrewshire, Paisley Grammar School and St. Andrew's Academy, we are working on developing a computer game which raises all the major issues of alcohol abuse in young people.

Zon

http://enterzon.com/

(USA) Zon is an unique interactive massively multiplayer online role playing game for learning Mandarin Chinese. By interacting in the Zon environment you will be exposed to Chinese language and cultural knowledge in a new and exciting way. Everything that you do in the game is another chance to learn new words, phrases and cultural info about China.

MMOGs (Massively Multiplayer Online Games)

Adellion

http://www.adellion.com/

Adellion is a world imagined and created by HonourBound and Adellion enthusiasts. Though the world classifies as a fantasy world, it holds many more similarities with our earthly reality than the norm of the fantasy-genre. In Adellion magic and other supernatural phenomena belong only in myths and beliefs.

Adventure Quest

http://www.adventurequest.com/

(USA) AdventureQuest is a fully Flash-animated RPG that you can play when you are on your lunchbreak, when the big game servers go down, or even for hours every day! You fight against hordes of monsters and enemies so that you can grow stronger and obtain ancient weapons of unimaginable power. You need nothing more than your web browser and the latest Macromedia Flash plugin to play.

Age of Conan: Hyborian Adventures

http://www.ageofconan.com/

(International) Age of Conan: Hyborian Adventures is a massively-multiplayer online role-playing game (MMORPG) based on the world and works of acclaimed author Robert E. Howard. In Age of Conan, players enter Hyboria with thousands of their friends and enemies to live, fight, and explore the dark and brutal world of King Conan.

agoraXchange (currently in design phase)

http://www.agoraxchange.net/

(USA) agoraXchange is an online collaboration for imagining and building a massive multiplayer online game that offers a tangible political alternative to our current world order. It's also a great way to experience the decision making behind our present political institutions.

America's Army

http://www.americasarmy.com/

(USA) A game created by the Army where players are bound by Rules of Engagement (ROE) and grow in experience as they navigate challenges in teamwork-based, multiplayer, force versus force operations. In the game, as in the Army, accomplishing missions requires a team effort and adherence to the seven Army Core Values. Through its emphasis on team play, the game demonstrates these values of loyalty, duty, respect, selfless service, honor, integrity and personal courage and makes them integral to success in America's Army.

Anarchy Online

http://www.anarchy-online.com/

(International) Anarchy Online is a science fiction themed massive multiplayer online roleplaying game. Step almost 30,000 years into the future, to an age where common surgical implants and microscopic nano-bots can relieve most forms of human suffering... or transform any normal being into a weapon of destructive force.

Asheron's Call

http://ac.turbine.com/

(USA) Asheron's Call develops a heroic fantasy setting familiar enough to draw you in yet mysterious enough to draw you onward. A varied host of monsters populate the benighted, medieval terrain; mysterious artifacts of great power embellish vast treasure hoards; and sorcerers, fighters, and rogues plot both heroic alliances and base villainy.

Audition

http://au.mmosite.com/

The Audition is the online dance game where all can enjoy the great dance with simple key note input. Compete with friends or come up with perfect choreography.

A World of My Own

http://www.awomo.com/

(United Kingdom) AWOMO™ is the world's first 3D games platform dedicated entirely to games and gamers. AWOMO™ will offer the worlds best games, playable within minutes rather than hours. The games are set within a virtual island where the global games community can meet, talk, sample free games, buy stuff, and enter tournaments to win big prizes.

Bots

http://bots.acclaim.com/

(USA) The balance of cyberspace is in danger! Last night, there was a disruption in the digital world. Corrupted sectors are turning every day BOTS into evil viruses. You must join forces with friends old and new to defeat ever-spawning new foes. Buy and trade accessories for endless combinations and begin your quest to save yourself and the digital world. For all ages.

City of Heroes

http://www.cityofheroes.com/

(USA) City of Heroes® brings the world of comic books alive in this massively multiplayer 3D online universe. Craft your hero's identity and join millions of Hero characters in a constantly expanding universe, explore the sprawling online metropolis of Paragon City™, and battle a host of foes including criminals, villains, and monsters.

Club Penguin

http://www.clubpenguin.com/

(USA) Club Penguin is a snow-covered, virtual world where children play games and interact with friends in the guise of colourful penguin avatars. Players create a penguin, then waddle around the island of Club Penguin, engaging in a variety of fun and imaginative activities. Players can chat, send greeting cards, use emotes (emotion icons) or choose from a set of pre-

defined actions such as waving or dancing. Users can also play games to earn virtual coins which can be used to buy clothing and accessories or furniture for their igloo. New content, such as games and theme parties, is added every week.

Dark Age of Camelot
http://www.darkageofcamelot.com/
(USA) Dark Age of Camelot is a massively multi-player online role-playing game conceived and developed by Mythic Entertainment. Set in the Kingdom of Albion in the years immediately following the death of King Arthur, players of the game enter a world in chaos, where Arthur's peace has been shattered and dark forces threaten the Kingdom. Unlike traditional role-playing games in which a player's greatest challenge is fighting computer-controlled monsters, players in Camelot will come face-to-face with their greatest challenge yet, other players.

Dofus
http://www.dofus.com/
(France) Dofus is a MMORPG combining an heroic fantasy world and a highly-coloured 2D design. Being both a role-playing game and an interactive cartoon, Dofus is aimed at both hardcore and casual gamers.

Dungeons and Dragons
http://www.ddo.com/
(USA) Dungeons & Dragons Online takes place in a story setting known as Eberron. Intrigue lurks around every corner and magic drives technology in this unique genre of sword and sorcery.

Empire of Sports
https://www.empireofsports.com/
(France) Empire of Sports is the first universe entirely dedicated to sports in which you only challenge real people.

Entropia Universe
http://www.entropiauniverse.com/
(Sweden) The Entropia Universe is more than a game. The Entropia Universe is for real. Real people, real activities and a Real Cash Economy in a massive online universe.

EVE Online
http://www.eveonline.com/
(Iceland) EVE is a massive multiplayer online game (MMOG) set in a science-fiction based, persistent world. Players take the role of spaceship pilots seeking fame, fortune, and adventure in a huge, complex, exciting, and sometimes hostile galaxy.

EverQuest
http://eqplayers.station.sony.com/
(USA) MMORPG set in a fantasy world.

Fashion Fantasy Game
http://www.fashionfantasygame.com/
(USA) Fashion Fantasy Game is a rapidly growing online game and social network for young women who are passionate about fashion, friends and fun. Developed by fashion industry veteran and successful entrepreneur Nancy Ganz, players of Fashion Fantasy Game design and sell virtual fashions in a competitive online environment that offers them a taste of what it would be like to have their own fashion businesses.

Football Superstars
http://www.footballsuperstars.com/
(United Kingdom) Football Superstars is the world's first Virtual Football World. An entire online virtual world designed by football fans exclusively for football fans, where you can enjoy a massively multiplayer experience on your PC.

Freaky Creatures
http://www.myfreakycreatures.com/
(USA) Freaky Creatures is a cross-platform, massively multiplayer online game that allows players to build the ultimate, customizable creatures and battle them against friends.

Fusion Fall: Cartoon Network Universe
http://www.fusionfall.com/
(USA) FusionFall is a Multiplayer Online Game that takes all of the best Cartoon Network characters and re-imagines them in an anime-inspired style, then sets them in dynamic new environments. Players create their own in-game avatars and battle alongside their favorite cartoon characters to save the world from an epic alien invasion. There are also opportunities to socialize and team up with friends online for dynamic group gameplay. It mixes all the action of a 3-D console platform game and all the customization, character development and open-ended world exploration of an MMORPG.

Galaxseeds
http://www.thebigrip.com/galaxseeds/
(Canada) GalaXseeds is a free massively multiplayer online game. In addition to exploring amazing worlds, you get to create your own character, customize your room, earn wealth and fame by raising Plants and help save the galaxy from the evil Spaceticides!

Galaxy Online
http://go.igg.com/
Galaxy Online is a massive real-time strategy game set in the vast expanses of the universe.

Guild Wars
http://www.guildwars.com/
(USA) Guild Wars® is an online role-playing game that rewards player skill and innovative gameplay over hours spent online.

Infinity: The Quest for Earth
http://www.infinity-universe.com/
Infinity is a massively multiplayer online game set in a persistent futuristic universe, currently in development. Infinity offers new and existing players an extensive storyline following the complex and often intricate political and social interactions of hundreds of corporations, organizations, and reputation groups.

Jumpgate
http://www.jossh.com/
(USA) Jumpgate is a Massively Multiplayer Online Flight Simulator - set in space. It's not an MMORPG - it's an MMO space flight and combat game.

Jumpgate Evolution
http://www.jumpgateevolution.com/
(USA) A definitive action-based Massively Multiplayer Online game set in a glorious, yet fierce new universe where the sheer vastness of space is your ultimate playground.

Lineage
http://www.lineage.com/
(USA) In the medieval world of Lineage, choose to be a gallant knight, a resourceful wizard, a crafty elf, a cunning dark elf, or a revered prince or princess. Play surrounded by guarded castles, perilous forests, sinister fens and valleys filled with the undead. Slay ferocious monsters unlike any known to man or elf.

Lineage II
http://www.lineage2.com/
(USA) Experience an immersive and dramatic fantasy world known for its unique political and economic systems. Engage in regular castle sieges, exciting monster encounters, and epic clan vs. clan warfare.

Lord of the Rings Online
http://www.lotro.com/
(USA) The Lord of the Rings Online™: Shadows of Angmar™ is the world's first and only MMOG based on the Books of J.R.R. Tolkien.

Mabinogi
http://mabinogi.nexon.net/
(South Korea) Fantasy MMORPG.

Magi-Nation
http://www.magi-nation.com/
(Canada) A fictional universe based on the trading card game of the same name.

Maid Marian
http://www.maidmarian.com/
(Canada) Maid Marian features a number of MMOG:
Sherwood Dungeon
Club Marian
Tank Ball2
Moon Base
Marian's World
Raginator
Comlin's Crazy Carrera

Maplestory
http://www.maplestory.com/
(South Korea) The world's first side-scrolling 2D online game, MapleStory offers cute, adorable graphics, a huge variety of items, and cool-looking avatars to leave its mark on the online game industry. Players hunt and engage in battles, explore a totally new and unknown world, put on beautiful clothes and accessories, make new friends, and play minigames.

Meez
http://www.meez.com/
(USA) Meez is a vibrant online social community that combines a virtual world, avatars and games, creating an immersive environment where users can personalize their identity, connect with friends, socialize and share media.

MU Online
http://www.muonline.co.kr/
(South Korea) MU Online is a 3D MMORPG that takes you, the player, into a fantasy world full of excitement, adventure and monsters. With several ways to train your character, MU is a sure way to a unique adventure. Join others in the quest to bring the continent of MU back to peace, and clear it from the clenches of Kundun and his forces forever.

Myst Online: Uru Live
http://www.mystonline.com/
(USA) Myst Online: Uru Live is a massive multiplayer online game in which you explore visually stunning worlds and solve puzzles, together with your friends and with people all over the world. Explorers like you create their own avatars, chat via text and voice, and take journeys together. They rediscover, restore and rebuild the ancient city of D'ni and learn about the history of its fallen civilization.

Mythos
http://www.mythicwars.com/Mythos/
(Canada) A free strategy game based on Greek Mythology.

NFL Rush Zone
http://nflrz.nflrush.com/
(USA) NFLRush Zone is the official NFL role-playing game. It is a football-inspired, virtual world, geared towards kids ages 6-13. The goal of NFLRZ is to entertain kids and, wherever possible, to teach them about fitness, community, and helping others.

Pirates of the Caribbean
http://www.piratesofthecaribbeanonline.com/
(USA) MMOG based on the Pirates of the Caribbean movies.

PowerUp: The Game
http://www.powerupthegame.org/
(USA) A free, 3-D online game by IBM that challenges teens to help save the planet "Helios" from sandstorms, floods, and "SmogGobs" before natural resources are depleted.

Puzzle Pirates
http://www.puzzlepirates.com/
(USA) An open-ended and community-driven MMOG where players take the role of a pirate and play puzzles during the course of the game.

Ragnarok
http://www.ragnarokonline.com/
(South Korea) An MMOG based on the Korean comic book of the same name.

RuneScape
http://www.runescape.com/
(United Kingdom) RuneScape is a massively-multiplayer online game (MMOG), set in a fantasy world of warring races, ravaged landscapes and sinister powers. Having chosen an adventurer, players are free to find their role within it: to live by the sword and face hundreds of enemies, to further the storyline in RuneScape's quests, or to train in any of a number of skills.

Scions of Fate
http://www.scionsoffate.com/
(South Korea) MMOG for all ages based on the comic book of the same name (*Yulgang* in Korean)

Secret World *(Upcoming)*
http://funcomssecret.com/
(Norway) The Secret World is a ―Massively Multiplayer Online" game combined with ―Alternate Reality Gaming" and social networking, currently in development at Funcom.

SocioTown
http://www.sociotown.com/
(USA) SocioTown is a web-based 3D Social MMOG (Massive Multiplayer Online Game). It features a fully immersive and persistent 3D environment with missions, jobs, and in-depth storyline.

Spider Riders
http://www.spiderriders.com/
(Canada) MMOG based on the science fiction/adventure franchise Spider Riders.

Star Wars Galaxies
http://starwarsgalaxies.station.sony.com/
(USA) In Star Wars Galaxies you can fight alongside Han Solo and Chewbacca, smuggle goods for Jabba the Hutt, defend Imperial stations from the ravages of the Rebels, create your own player city, put yourself in the pilot seat of your favorite Star Wars ship, and more.

Stargate Worlds
http://www.stargateworlds.com/
(USA) A science fiction adventure MMOG where players discover thriving alien worlds and explore ancient civilizations.

Ultima Online
http://www.uoherald.com/
(USA) A long-running fantasy online game that was instrumental in the development of the MMORPG genre.

Westward Journey
http://corp.163.com/eng/games/westward_journey.html
(China) ―Westward Journey Online II" is based on the famous and romantic Chinese classical fiction ―Journey to the West." It possesses of Chinese traditional painting style, with a touching story and well balanced game systems, it has become the most popular online game among all the China-made online games.

Whirled
http://www.whirled.com/
(USA) Whirled is a place where you can play games, make friends and design your own rooms. Everything in Whirled is created by the people who play it: the places, games, avatars, toys, and pets, so Whirled is whatever you want it to be.

World of Warcraft
http://www.worldofwarcraft.com/
(USA) As a massively multiplayer online game, World of Warcraft enables thousands of players to come together online and battle against the world and each other. Players from across the globe can leave the real world behind and undertake grand quests and heroic exploits in a land of fantastic adventure.

Closed MMOGs

EA-Land (formerly The Sims Online)
http://www.thesimsonline.com/
(USA) Online version of the popular computer game The Sims.

Habitat
(USA) The MMORPG launched in 1986 by Lucasfilm that was technologically influential in the development of virtual environments.

Legend of Mir
http://www.legendofmir.net/
(South Korea)

Virtual World Building Platforms

3D Explorer
http://www.3dxplorer.com/
(France and USA) 3DXPlorer is an online platform for designing interactive 3D web pages and virtual worlds including 3D spaces and 3D objects, in which web visitors can walk, visualize objects and interact as easily as they navigate through HTML pages, but in a 3D immersive mode.

ActiveWorlds
http://www.activeworlds.com/
(USA) Activeworlds offers a comprehensive platform for efficiently delivering real-time interactive 3D content over the web. Activeworlds' 3D content is dynamic, visually compelling and most importantly provides users a richer, more exciting online experience. Applications for Activeworlds' 3D technology are as diverse, creative and exciting as the product itself.

Alternativa Platform
http://www.alternativaplatform.com/
(Russia) Browser 3D-engine based on Adobe Flash. Advantages are obvious, Flash-plugin is installed in approximately 95% of users, this is habitual, cross-platform technology. Thanks to Alternativa3D, it is now available to show three-dimensional worlds, games, virtual tours or objects in browser.

Blink 3D
http://www.pelicancrossing.com/
(United Kingdom) Blink 3D is a platform for creating multi-user Web based virtual worlds and 3D environments. Blink 3D can be used for: Virtual Worlds, Games, Education, Virtual Heritage, Business, Online Stores, Machinima, Product Marketing and 3D chat.

Croquet
http://www.opencroquet.org/
(USA) Croquet is a powerful open source software technology that, in the form of the Croquet Software Developer's Kit (Croquet SDK), can be used by experienced software developers to create and deploy deeply collaborative multi-user online virtual world applications on and across multiple operating systems and devices.

Edusim3D
http://www.edusim3d.com/
(USA) Edusim is a free opensource 3D multi-user virtual world specifically for your classroom interactive whiteboard (Smartboard, Activeboard, Mimio, eBeam, or WiiBoard). Edusim is extendable allowing multiple classrooms to connect their interactive whiteboards for collaborative learning session.

ExitReality
http://www.exitreality.com/
Plugin that turns a 2D site into 3D.

Forterra Systems
http://www.forterrainc.com/
(USA) Forterra are the leading provider of private virtual world environments.

Gogofrog
http://www.gogofrog.com/
(Australia) Gogofrog is an online community that lets you meet your family and friends make new friends and if you want get thousands of people to visit your online business space or profile. At Gogofrog you can share your art, photos, journals and interests with an ever-expanding network of friends and visitors! You can connect your space directly with one friend or many, your whole family, the whole Gogofrog community or the whole online world. It's your web space and your choice.

Metaplace
http://www.metaplace.com/
(USA) A virtual world building platform for all, a universe of user-created worlds to explore, a marketplace for user creations, a place to meet, play games, and socialize.

Multiverse
http://www.multiverse.net/
(USA) Multiverse's unique technology platform will change the economics of virtual world development by empowering independent game developers to create high-quality, Massively Multiplayer Online Games (MMOGs) and non-game virtual worlds for less money and in less time than ever before.

Mycosm
http://www.mycosm.com/
(Australia) Your own 3D world, free. Create your own unique world and share it with friends online. Play games, share media, chat, make money, all in breathtaking 3D graphics.

Ogoglio
http://ogoglio.com/
(USA) A web platform for browser based social 3D spaces.

Project Darkstar

http://www.projectdarkstar.com/

(USA) Created by Sun Microsystems, Project Darkstar aims to help developers and operators avoid a range of serious, yet typical, problems associated with massive scale online games, virtual worlds, and social networking applications today, including zone overloading, data corruption, and server underutilization. In addition, Project Darkstar enables developers to support new dimensions of play such as evolving virtual worlds and very large scale battlefields.

RealXtend

http://www.realxtend.org/

(Finland) realXtend offers a free open source virtual world platform with which you can create your own applications using it as a base.

RocketOn

http://www.rocketon.com/

(USA) RocketOn is the only virtual world platform that allows your users to get an avatar with the click of a button and begin browsing your entire website. With RocketOn, you can seamlessly transform your website into a thriving virtual community and allow your users to interact with one another in a rich way.

Second Life

http://secondlife.com

(USA) The most popular virtual world.

Sloodle

http://www.sloodle.org/

(United Kingdom) Sloodle is an Open Source project which integrates the Second Life® multi-user virtual environment and the Moodle learning-management system. Sloodle provides a range of tools for supporting learning and teaching to the immersive virtual world; tools which are fully integrated with a tried and tested web-based learning management system used by thousands.

Solipsis

http://www.solipsis.org/

(France) Create a public, massively-shared and user-generated unbound digital universe, sustained by a dedicated Peer-to-Peer protocol, with a modern day rendering engine and some great and accessible 3D modelling tools. In other words: a decentralized Metaverse platform.

Unity

http://unity3d.com/

(Denmark) Unity is a multiplatform game development tool, designed from the start to ease creation.

Uni-Verse

http://www.uni-verse.org/

(Europe) An open source Internet platform for multi-user, interactive, distributed, high-quality 3D graphics and audio for home, public and personal use. The platform will support high-quality 3D-graphics as well as high-quality 3D-audio and acoustic simulation.

VastPark
http://www.vastpark.com/
(Australia) A series of tools, APIs and libraries that you can use to make and deploy (and even monetize) your own virtual worlds and 3D widgets for corporate, educational and commercial purposes.

Wonderland
https://lg3d-wonderland.dev.java.net/
(USA) Project Wonderland is a 100% Java and open source toolkit for creating collaborative 3D virtual worlds. Wonderland is completely extensible; developers and graphic artists can extend its functionality to create entire new worlds and new features in existing worlds.

Worlds.com
http://www.worlds.com/
(USA) Worlds.com is the pioneering platform in 3D virtual communities and rich immersive environments. Launching in 1994, Worlds leverages its patented proprietary technology in partnership with brand leaders in specific market segments to offer users multi-user environments that have interactive Avatars, rich media graphics, text chat, voice-to-voice chat, video and e-commerce.

IV. Game engines

Engine/ Description/URL	Difficulty (5 = easiest)	Language/Scripting	Operating System (authoring)	Platform (publishing)	Usage	Cost and Licensing
3impact 2d and 3d game engine, featuring C++ syntax, multi-bone skeletal animation, mesh warping, texture animation, accurate collision response, constraints, stacked objects, volumetric shadows, particle systems, true mirror surfaces, 3d ogg sounds and network-synchronized simulation http://www.3impact.com/	3.5	C/C++ Delphi BASIC	Windows	Windows	Games 3D Models	Royalty-free and one year free upgrades. After one year you can purchase an additional year of free upgrades for $49.50.
Audacity Audacity is an open-source sound editor. It can be used to record and manipulate audio files for incorporation into a game. http://audacity.sourceforge.net/	2		Windows Mac Linux		Sound editing	Downloadable. Free for use. Open source.

Blender Open source 3D modeling, rendering, animation and realtime 3D game/simulation development system http://www.blender.org/	4	C/C++ Python	Windows Linux Mac Solaris		Media & Entertainment Commercial games	Free. Open source.
C4 Comprehensive suite of game programming tools, including graphics engine, integrated support for sound, music, networking, input devices, resource management, and much more http://www.terathon.com/c4engine	4	C/C++ Graphical script editor	Windows Mac	Windows Mac PS3 Xbox Wii	Commercial and Indie Games Education 3D Simulations	Academic edition (for classroom use): $2500 unlimited users / $250 per person for small groups Standard edition: $350 per programmer for up to 5 users, and $250 each afterward Pro and Industrial Editions also available. Contact Terathon for details.

						Demo version also available.
CityEngine For creation of urban 3D environments, real or fictional http://www.procedural.com/		Python	Windows Mac Linux		Games Film and tv Virtual worlds Architecture Archeology Urban simulations	Free 30-day trial available. CityEngine SE: $3450 CityEngine PRO: $4950 CityEngine EDU: $695
CryEngine All-in-one game development solution, next-gen ready http://www.cryengine3.com/	4.5	C/C++ Lua	Windows	Windows Xbox PlayStation GameCube	Virtual worlds Commercial games	Game, Serious Game, and Educational Licenses. Pricing available after registering on website.

Crystal Space free cross-platform software development kit for realtime 3D graphics, with particular focus on games http://www.crystalspace3d.org/	3.5	C/C++ Python Perl Java	Windows Linux Mac		Commercial games	Free. Open source.
Delta3D A fully-featured game and simulation engine, specifically suited to the Modeling and Simulation and DoD communities such as High Level Architecture (HLA), After Action Review (AAR), large scale terrain support, and SCORM Learning Management System (LMS) integration. Currently supported by the US Dept of Defense http://www.delta3d.org/	3.5	C/C++ Python	Windows Linux	Cross-platform	Government & Military Games Education Training Visualizations	Free. Open source.
DX Studio 3D graphics engine, includes both 2D and 3D layout editors, Using DX Studio you can build complete real-time interactive applications, simulations or games, for standalone use or for embedding in other Microsoft Office/Visual Studio applications. http://www.dxstudio.com/	4.5	JavaScript	Windows		Commercial games Simulations	Freeware edition available with limited features. *in British Pounds:* Non-commercial edition for home/student use: GBP 50 Standard

						Edition GBP 100 Pro Edition
						Commercial edition GBP 250 Standard Edition GBP 500 Pro Edition
Gamemaker Features an easy-to-use drag-and-drop interface for creating computer games http://www.yoyogames.com/gamemaker		N/A (drag-and-drop interface)	Windows	Windows	Games	Lite Edition: Free Pro Edition: $25
GNU Image Manipulation Program (GIMP) GIMP is a versatile graphics manipulation package. This tool is used to create and edit textures and other graphics for a game. http://www.gimp.org/	2		Windows Mac OS X Linux Sun OpenSolaris FreeBSD		Graphics editing	Downloadable. Free for use. Open source.
jMonkey Engine A high performance scenegraph-based graphics API http://www.jmonkeyengine.com/	4	Java	Windows Mac Linux		Commercial games Education	Free. Open source.

LawMaker Game Engine Cross-platform high performance real-time 3D engine http://www.darkroomstudios.com/content/view/13/27/	3	C/C++	Windows		Commercial games Virtual reality systems Multimedia presentations Education	Free evaluation available. Various licensing packages from $99.99 to $1999.99.
Microsoft ESP Used for Flight Simulator, visual simulation software development platform with a rich set of simulation capabilities in one environment, including tools for object placement, scenery and terrain customization, object activation, special effects, and environmental controls such as adjustable weather http://www.microsoft.com/ESP/		XML C++	Windows		Training Government Education	Licensed via Microsoft's Volume Licensing programs; currently distributed only through reseller partners. See website for more info.
Milkshape 3D a low-polygon modeler used to create world objects, avatars, animations and more. It supports more than 70 file formats. http://chumbalum.swissquake.ch/	3		Windows		3D Modeling	Downloadable. 30-day free evaluation followed by a $35 single-user

						license
Mosbe Supports 2D and 3D views, from one to 16 players over a LAN, and comes with an inventory of objects that can be modified to simulate real-time logistics, supply management, 4C (command, control, computers and communications) and ISR (intelligence, surveillance and recon) situations. Package includes a world builder, scenario editor and asset libraries. http://www.mosbe.com/		C++	Windows	Windows	Simulation and real-time strategy for military and healthcare	Developer License (World building): $75,000.00 Manager License (Object building): $25,000.00 Professional Viewer License (Scenario building): $2,500.00 Viewer License (Run time capability): $200.00
Multiverse Complete MMOG / virtual world platform, including server, client, tools, game network, and starter assets	3	C# Python	Windows		Government & Military Corporate Educatio	Free for non-commercial use. If income

http://www.multiverse.net/					n MMOGs	is generated by virtual world, Multiverse takes 10%.
NeoAxis Engine All-purpose, modern 3D graphics engine for 3D simulations, visualizations and games http://www.neoaxisgroup.com/	4	C/C++ C#	Windows		3D virtual worlds Commercial games Simulations Training	Non-commercial: Free Indie: $95 Commercial: $395 Source (full license): $9,800
Newton Physics Engine an integrated solution for real time simulation of physics environments. The API provides scene management, collision detection, dynamic behavior and yet it is small, fast, stable and easy to use. http://newtondynamics.com/		C	Windows Mac Linux	Windows MAC (including iPhone and iPod touch) Linux		Open Beta version available for free.

NICE Supports 2D graphical environment, customizable avatars, bubble chat, transcription, bulletin board, calendar, event scheduling tools, moderator tools, conferencing tools, document sharing, collaborative editing, shared desktop, and patented language filters and community safety tools http://www.numedeon.com		Java		Any CPU/OS with a browser and a 56kb modem.	Virtual worlds (e.g. Whyville.com) Education (e.g. University of Texas Medical School)	For use only by Numedeon (company offers development services)
Nullsoft Scriptable Install System (NSIS) NSIS is a tool for the development of Windows installers. This tool is used to combine game resources for distribution and installation. http://sourceforge.net/projects/nsis/	2		Windows	Windows	Installers	Downloadable. Free for use. Open source.
OGRE A scene-oriented, flexible 3D engine written in C++, designed to provide just a world-class graphics solution http://www.ogre3d.org/	4	C/C++	Windows Linux Mac	Windows Linux Mac	Games Simulators Educational Software Scientific visualizations	Free. Open source.

OLIVE Forterra Systems' platform for creating solutions for clients http://www.forterrainc.com/		C++		Windows Linux	Virtual worlds Simulations (Healthcare, military) Education	Licensed with development services from Forterra
Open Dynamics Engine (ODE) high performance library for simulating rigid body dynamics. It has advanced joint types and integrated collision detection with friction. Useful for simulating vehicles, objects in virtual reality environments and virtual creatures. It is currently used in many computer games, 3D authoring tools and simulation tools. http://www.ode.org/	3.5	C/C++		Windows Linux Mac	Simulations Virtual worlds Commercial games	Free. Open Source.
Panda 3D 3D rendering and game development http://www.panda3d.org/	4.5	C/C++ Python		Windows Linux Mac Sun	Games Virtual training Simulations	Free. Open source.
Power Render **R**ealtime 3D game and rendering engine designed for developers using Microsoft Visual C++ and DirectX 9 http://www.powerrender.com	4	C/C++		Windows Xbox	Game Development Education Military Simulation Architectural visualization Characte	Free demo available. Full source code: $100

					r animation	
Quake Army Knife (QuArK) QuArK is used to model complex 3D shapes and maps, including those things that can be walked on (e.g., bridges) or in (e.g., buildings). http://quark.sourceforge.net	4	Python	Windows		3D Modeling	Downloadable. Free for use. Donations accepted.
Quest3d Very flexible authoring environment for real-time 3D applications http://quest3d.com/	4	C/C++ Graphical scripting Lua	Windows		Education Visualizations Animations Virtual reality Games	Demo edition available. Full version available through resellers.
Sealund Serious Games Used to create simple question-and-answer games. Sealund offers various applications by game type: Inquiry (2D) - board game AssessAll (2D) - board game Racetrack (3D) - Race game Just PlayIt (3D) - Jeopardy-like game http://www.sealund.com/		N/A (easy-to-use wizard interface)	Windows Mac	Windows Mac (requires Flash software to run games)	Business training Education	Contact company for pricing.
Source Features character animation, advanced AI, real-world physics, and shader-based rendering http://source.valvesoftware.com/	4.5	C/C++	Windows		Games	Discussed under a non-disclosure agreement.

StemCell Engine Complete platform for creating games and 3D applications http://www.devcellsoftware.com/	3	C/C++	Windows		Games	Indie: $495 Commercial, Professional, Educational: contact DevCell for details
The Nebula Device 2 Free 3D game engine used for commercial games and visualization applications http://nebuladevice.cubik.org	3.5	C/C++ TCL Python Lua	Windows	Windows Linux Mac Xbox etc (Multi-platform)	Commecical games Professional visualization applications	Free. Open source.
Thinking Worlds Versatile educational games authoring engine, based on well researched and proven learning principles http://www.thinkingworlds.com/		Proprietary scripting language	Windows	Cross-platform	Serious Games Immersive Learning Environments Visualizations	30-Day Free Trial available. *in British pounds:* Educational Faculty License: 1999 GBP Annual Developer Seat License: 999 GBP

Tokamak Real-time physics engine designed specially for games http://www.tokamakphysics.com/		C++				Free. Open Source.
Torque Popular fully featured game engine for 2D and 3D games http://www.garagegames.com	3	C++	Windows Mac Linux	PC Mac Xbox Wii	Games, including serious games Virtual worlds Training simulations Education	Torque 3D Professional: $950 Torque 2D: $250 Special Education Licensing available for schools. Contact GarageGames for details
Unigine Unigine contains graphics engine (with HDR and soft shadows support), physics engine (with ragdoll, fluid buoyancy, ray car, joints destruction support), easy-to-use C++ API, script interpreter with C-like syntax and virtual 3D GUI http://www.unigine.com/	3.5	UnigineScript (Similar to C++ syntax)	Windows Linux	PC PlaySta tion 3	Virtual worlds Simulators Commercial games 3D Animated movies	Various license options on a per-project basis (from $19,900 to $40,000). Free evaluation kit available.

Unity Complete game engine http://unity3d.com/	4.5	C# JavaScript	Windows Mac	Windows Mac Nintendo Wii iPhone Browser-based	Games	Unity Indie: $199 Unity Pro: $1499
Unreal3 Advanced Learning Technology A complete game development framework for next-generation consoles and DirectX9-equipped PC's, providing the vast array of core technologies, content creation tools, and support infrastructure required by top game developers, was used to create America's Army http://www.virtualheroes.com/ http://www.unrealtechnology.com/	3.5	C/C++		Windows Linux Mac XBOX PS3	3D Virtual Worlds Simulations	Cost of the A.L.T. platform with the Unreal engine and client software are built into each project, and vary depending on the specifications. Prototypes start in the $25-40k range.
Vicious Engine Comprehensive middleware solution for creating dynamic games, including cross-platform conversions. Used by Indiana University School of Education students working on computer (serious) game design. http://www.viciousengine.com/	3	C/C++ Point-and-click		Windows, Xbox, Playstation, GameCube, PSP, Nintendo Wii	Games Education	Contact company for pricing. 90-day evaluation available.

Vision Game Engine by Trinigy Superior run-time rendering, state-of-the-art exporters for the latest versions of Max and Maya, a WYSIWYG scene editor with a myriad of useful tools and fully integrated middleware technologies, a lighting editor, as well as model, scene and resource viewers http://www.trinigy.net/		C/C++		PC Xbox PlaySta tion Ninten do Wii	All sorts of games including serious games, simulatio ns	Tailored licensing per project, contact company . 30-day free evaluatio n available.
Visual 3d.NET A complete simulation and game development platform that integrates all of the necessary tools and technologies needed to build 3D applications into a single software product http://www.visual3d.net/	4	C# VB.NET IronPython Lua.NET	Windo ws	Windo ws Xbox	Military training 3D Simulatio ns Commer cial games	Student: $95 Indie: $195 Professio nal: $995 Enterpris e: $19,500
Vortex by CM Labs Engineering-oriented simulation software for behaviour of vehicles, robotics, and heavy equipment in real-time synthetic environments for operator training and test http://www.vxsim.com/		C++	Windo ws Linux		Engineeri ng Defense Educatio n	Contact CM Labs for product pricing details.

Updated list of game engines

http://www.freebase.com/view/cvg/computer_game_engine

V.   Bibliography

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   Summary: "This book offers insight into the computer science aspect of simulation and modeling while integrating the business practices of SM. It includes current issues related to simulation, such as: Web-based simulation, virtual reality, augmented reality, and artificial intelligence, combining different methods, views, theories, and applications of simulations in one volume"--Provided by publisher.

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Description: Simulations and the Future of Learning offers trainers and educators the information and perspective they need to understand, design, build, and deploy computer simulations for this generation. Looking back on his recent first-hand experience as lead designer for an advanced leadership development simulation, author Clark Aldrich has created a detailed case study of the creation and deployment of an e-learning simulation that had the development cycle of a modern computer game. With this book Aldrich, a leader in the e-learning field, has created an intriguing roadmap for the future of learning while taking us along on an entertaining rollercoaster ride of trial and error, success and failure. Simulations and the Future of Learning outlines the design principles and critical decisions around any simulation's components— the interface, the physics and animation systems, the artificial intelligence, and sets and figures. Using this accessible resource, readers will learn how to create and evaluate successful simulations that have the following characteristics: authentic and relevant scenarios; applied pressure situations that tap user's emotion and force them to act; a sense of unrestricted options; and replayability.

Aldrich, C. (2005). Learning by Doing: A Comprehensive Guide to Simulations, Computer Games, and Pedagogy in e-Learning and Other Educational Experiences. San Francisco: Pfeiffer.

Description: Designed for learning professionals and drawing on both game creators and instructional designers, Learning by Doing explains how to select, research, build, sell, deploy, and measure the right type of educational simulation for the right situation. It covers simple approaches that use basic or no technology through projects on the scale of computer games and flight simulators. The book role models content as well, written accessibly with humor, precision, interactivity, and lots of pictures. Many will also find it a useful tool to improve communication between themselves and their customers, employees, sponsors, and colleagues. As John Coné, former chief learning officer of Dell Computers, suggests, ―Anyone who wants to lead or even succeed in our profession would do well to read this book.‖

Aldrich, C. (2007). Do Sims Work Better than Traditional Instruction? Retrieved November 24, 2007, from Style Guide for Serious Games and Simulations Web site: http://clarkaldrich.blogspot.com/search/label/Simulation%20Case%20Studies%20and%20Anecdotes

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Summary: Web 2.0 projects have rapidly expanded into a world of social media. From blogs to podcasts, millions of people have published and shared a growing amount of digital content. At the same time virtual worlds have grown in popularity, from massively multiplayer games like *World of Warcraft* to metaverse projects like Second Life. How do these two movements apply to higher education? Where do Web 2.0 and the metaverse connect? What trends are emerging for the near future?

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Allison, D., & Hodges, L. F. (2000). Virtual reality for education? In Proceedings of the ACM symposium on Virtual reality software and technology (pp. 160-165). Seoul, Korea: ACM. doi: 10.1145/502390.502420.

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Anderson, J. R. (2005). The Relationship Between Student Perceptions of Team Dynamics and Simulation Game Outcomes: An Individual-Level Analysis. Journal of Education for Business, 81(2), 85-90. Retrieved from Academic Search Complete database.

Abstract: In many business courses, computer-based simulations are becoming a popular choice of pedagogical technique, yet research is only beginning to consider how these simulation games impact student outcomes. In this study, the author investigated individual perceptions of simulation team dynamics and their relationship to student affect regarding the simulation as well as simulation performance in a sample of 172 responding students. The results showed that a student's affect regarding the simulation game was influenced by student team cohesion and student team independence. Alternatively, student simulation performance was influenced by team heterogeneity, opportunistic practices, and hypothesis-driven thinking. These findings encourage instructors to consider thoughtfully the outcomes they want students to experience when structuring student teams that will participate in simulation learning games.

Anderson, J. (2009). Real Conversations in Virtual Worlds: The Impact of Student Conversations on Understanding of Science Knowledge in Elementary Classrooms. American Educational Research Association Annual Meeting – San Diego, CA.

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Abstract: Provides an overview of virtual reality from an education perspective. Defines the technology in terms of equipment and participatory experience, examines the potential applications of virtual reality in education and training, and considers the concerns and limitations of the technology. Overall, research indicates that virtual reality offers enormous educational possibilities.

Andrews, D. H. (1995). Potential modelling and simulation contributions to air education and training command flying training: specialized undergraduate pilot training. Brooks Air Force Base, TX: Armstrong Laboratory, Air Force Materiel Command.

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Annetta, L., Klesath, M., & Holmes, S. (2008). V-Learning: How Gaming and Avatars are Engaging Online Students. Innovate, 4(3).

Abstract: Len Annetta, Marta Klesath, and Shawn Holmes describe how avatars in virtual learning environments (VLEs) can contribute to the learning experience by giving students a sense of social presence and investment in the learning community that may otherwise be difficult to access. VLEs have the potential to become the next generation of instructional tools for online learning. By allowing students to simulate the campus experience online, VLEs offer rich, flexible class environments without compromising their reach to diverse students desiring online courses. Describing studies carried out in the WolfDen VLE, Annetta, Klesath, and Holmes examine how gaming and avatars are engaging online students and the role personality may play in a student's selection of an avatars.

Annetta, L., et. al. (2006). Serious Games: Incorporating Video games in the Classroom. EDUCASE Quarterly, 29(3). Retrieved March 15, 2009, from http://www.educause.edu/EDUCAUSE+Quarterly/EDUCAUSEQuarterlyMagazineVolum/SeriousGamesIncorporatingVideo/157412.

Antonacci, D. & Modaress, N. (April 2008). Envisioning the Educational Possibilities of User-Created Virtual Worlds. *AACE Journal*, 16(2). 115-126.

Abstract: Educational games and simulations can engage students in higher-level cognitive thinking, such as interpreting, analyzing, discovering, evaluating, acting, and problem solving. Recent technical advances in multiplayer, user-created virtual worlds have significantly expanded the capabilities of user interaction and development within these simulated worlds. This ability to develop and interact with your own simulated world offers many new and exciting educational possibilities. This article explores the technical capabilities and educational potential of these new worlds. Additionally, it presents and illustrates a model, which uses interaction

combinations, to identify course content and topics having educational applications in virtual worlds.

Antonietti, A., Rasi, C., Imperio, E., & Sacco, M. (2000). The Representation of Virtual Reality in Education. Education and Information Technologies, 5(4), 317-327. doi: 10.1023/A:1012057608694.

Abstract: Students' opinions about the opportunities and the implications of VR in instruction were investigated by administering a questionnaire to humanities and engineering undergraduates. The questionnaire invited participants to rate a series of statements concerning motivation and emotion, skills, cognitive styles, benefits and learning outcomes associated with the use of VR in education. The representation which emerged was internally consistent and articulated into specific dimensions. It was not affected by gender, by the previous use of VR software, or by the knowledge of the main topics concerning the introduction of IT in instruction. Also the direct participation in a training session based on an immersive VR experience did not influence such a representation, which was partially modulated by the kind of course attended by students.

Appell, L. S. (1989). Using simulation technology to promote social competence of handicapped students: final report: executive summary. Washington, DC: US Dept. of Education, Office of Educational Research and Improvement, Educational Resources Information Center.

Au, W. (2008). The making of Second Life : notes from the new world (1st ed.). New York: Collins.

Description: The Making of Second Life is the behind-the-scenes story of the Web 2.0 revolution's most improbable enterprise: the creation of a virtual 3-D world with its own industries, culture, and social systems. Now the toast of the Internet economy, and the subject of countless news articles, profiles, and television shows, Second Life is usually known for the wealth of real-world companies (Reuters, Pontiac, IBM) that have created "virtual offices" within it, and the number of users ("avatars") who have become wealthy through their user-created content. Wagner James Au explores the long, implausible road behind that success, and looks at the road ahead, where many believe that user-created worlds like Second Life will become the Net's next generation and the fulcrum for a revolution in the way we shop, work, and interact. Au's story is narrated from both within the corporate offices of Linden Lab, Second Life's creator, and from within Second Life itself, revealing all the fascinating, outrageous, brilliant, and aggravating personalities who make Second Life a very real place—and an illuminating mirror on the real (physical) world. Au writes about the wars they fought (sometimes literally), the transformations they underwent, the empires of land and commerce they developed, and above all, the collaborative creativity that makes their society an imperfect utopia, better in some ways than the one beyond their computer screens.

Ausburn, F. B., & Ausburn, L. J. (2008). Virtual Reality in CTE. Techniques: Connecting Education & Careers, 83(7), 43-46. Retrieved from Academic Search Complete database.

Abstract: The article focuses on virtual reality (VR), an educational tool or strategy to take students on location anywhere without leaving the classroom. Virtual reality, which was

introduced in the late 1960s, includes various types of computer-based experiences which encompasses from fully immersive environments having complex head-mounted display (HMD) gear and body suits to realistic PC-based programs. All types of VR aim to stimulate a three dimensional location through computer generated imagery.

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Ayiter, E. (2008). Integrative art education in a metaverse: ground. Technoetic Arts: A Journal of Speculative Research, 6(1), 41-53. doi: 10.1386/tear.6.1.41_1.

Abstract: Virtual learning environments (VLEs) present us with unprecedented opportunities in bringing together students and educators from widely disparate geographical locations, as well as diverse cultures and backgrounds to participate in a learning experience that should take into cognizance the affordances of these novel arenas in the design of both content and the environment(s) in which this content is to be implemented/enacted. While VLEs do seem to address the requirements of well-structured learning endeavours, the boundaries of which are clearly defined, they are challenged where complex learning material in which boundaries are less easily defined, as is the case in art/creativity education, are concerned. Given that the learning content of the creative fields is open ended by its very nature and as such does not seem to readily lend itself to an implementation within the structure of present-day, two-dimensional virtual learning environments, can such an environment/methodology be developed in the open-ended three-dimensional structure of a metaverse, based upon the critical examination of a real-life, historic precedent?

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Begg, M., Dewhurst, D., & Macleod, H. (2005). Game-Informed Learning: Applying Computer Game Processes to Higher Education. Innovate, 1(6).

Abstract: The unique ability of games to stimulate long periods of interaction with challenging tasks and generate powerfully active communities make them a potential source of the kind of active, constructive, collaborative learning experiences that educators seek to bring to their classrooms. Michael Begg, David Dewhurst, and Hamish Macleod point out as well that the the process of game play is so similar to the learning processes outlined in constructivist theory and problem-based learning that they are nearly interchangeable. As currently used in the classroom, however, where the game is treated as a host into which content is embedded, game-based learning falls far short of providing the potentially deep learning experience that it could provide. Instead, Begg, Dewhurst, and Macleod advocate game-informed learning through which educators can appreciate the processes and principals of successful gaming—the learning principles within the game—and utilize them, where appropriate, to enrich the learning experience. They examine a number of different game-like simulations in the medical curriculum at the University of Edinburgh and conclude that the success of a given simulation can be defined by the extent to which they have been game-influenced.

Beinisch, Y., Paunov, C., Vickery, G., & Wunsch-Vincent, S. (2005). The online computer and video game industry. Working Party on the Information Economy. Paris, France: Organisation for Economic Co-operation and Development. Retrieved May 17, 2009, from http://www.oecd.org/dataoecd/19/5/34884414.pdf.

Abstract: Computer and video games is a young industry with rapid growth underpinned by technological development. The global market in 2003 was over USD 21 billion compared with USD 32 billion for the recorded music industry. The main segments are off-line consoles and PCs; online and wireless games are still relatively small but there is a general online trend and the industry is increasingly strategic for media, Internet and consumer electronics firms. ―Dis-intermediation" is occurring in the value chain as distributor and retail roles are taken by publishers directly or via ISPs and game Web sites. ISPs are also acting as content aggregators and game Web sites and portals as retailers (―re-intermediation"). Development barriers include the availability of network infrastructure, skills and management challenges, financing issues, and the legal and payments infrastructure. The policy framework affecting the industry includes R&D and technology, market and skills development; IPR and piracy issues; online business conditions including broadband quality, micro-payments, standards and taxation issues; and social dimensions including culture, age ratings and content issues, and games applications in education.

Benford, S., Ingram, R., & Rodden, T. (1992). Exploiting virtual reality as a conceptual model for CSCW. In Using Virtual Worlds, IEE Colloquium on (pp. 1/1-1/5).

Abstract: This paper describes some computer supported cooperative work (CSCW) research which has focused on the development of a global CSCW Environment a kind of CSCW Operating System which allows people to access a variety of existing cooperative tools within a common organizational context and also against a background of more social interaction. This Environment is based on a virtual world of interconnected rooms through which people navigate, forming groups and carrying out tasks. Each room provides access to a number of tools, awareness of on-going events and also encourages open communication with other occupants

Bergeron, B. (2006). Developing serious games. Hingham, MA: Charles River Media.

Summary: With the impressive growth the games industry has enjoyed for the past decade, game developers, educators, and marketing firms are excitedly envisioning serious games applications for computer game technologies. These applications- serious games- represent opportunities for game developers to apply their talents to areas outside of the entertainment industry. Developing Serious Games is a practical handbook that details what's involved in developing these serious games. It explores the emergence of serious games as a viable niche in the multi-billion dollar gaming industry, and it covers the various types of serious games, including military, academic, medical, and training & development. From there it continues with a discussion of the enabling technology trends, emerging standards, and the tools that promise to reinforce the current trajectory of development and user demand for serious games. The second half of the book emphasizes the economic realities of the serious games industry, including and evaluation of the market, the economic potential of the space, and the customer base. The book culminates with a serious game design document that illustrates the important differences between entertainment games and serious games. It also provides a look to the future of serious gaming from a developer's perspective. The book is written for students, established game developers, and professionals in related fields, such as modeling and simulation or instructional design, who are skilled in training with traditional approaches and tools. It is also applicable to programmers, graphic artists, and management contemplating or involved in the development of serious games. Key Features: * Teaches developers how to get into the serious games market and be successful * Details the serious games design document and explains the critical differences from games that entertain * Presents tools and techniques that can be applied to real-world development challenges * Teaches how to identify and obtain funding sources * Illustrates the entire process of development from choosing game shells and engines to marketing * Discusses key technologies, including middleware, shells, content provides/generators, etc. * Provides an extensive resource section for established and burgeoning game developers

Bertoline, G. R. (2007). Cyberinfrastructure-Enabled Learning Environments for Gen Z. ELI Spring Focus Session, Immersive Learning Environments: New Path to Interaction and Engagement, March 27-28, 2007.

Abstract: Cyberinfrastructure is revolutionizing the scientific-research landscape and is positioned to similarly revolutionize learning. The challenge for educators is to find an

innovative strategy that incorporates the best of traditional pedagogy with new paradigms that reflect our times. This presentation outlines how computation, visualization, storage, and high-speed networks can create novel learning environments.

Bertoline, G. R. & Dorjgotov, E. (2007). The Impact of Computer-Simulated Haptic Force Feedback on Learning. ELI Spring Focus Session, Immersive Learning Environments: New Path to Interaction and Engagement, March 27-28, 2007.

Abstract: Many scientific, mathematic, and engineering concepts often require learners to build abstract mental models that involve invisible factors, such as intangible force fields and interactions among charged particles. This parlor will demonstrate the use of haptics devices and visualization to improve student learning and retention in science, math, and engineering.

Birchfield, D., Johnson-Glenberg, M., Megowan-Romanowicz, M. (2009). Next Gen Interfaces: Embodied Learning Using Motion, Sound, and Visuals – SMALLab. American Educational Research Association Annual Meeting – San Diego, CA.

Blake, C., & Scanlon, E. (2007). Reconsidering simulations in science education at a distance: features of effective use. Journal of Computer Assisted Learning, 23(6), 491-502. doi: 10.1111/j.1365-2729.2007.00239.x.

Abstract: This paper proposes a reconsideration of use of computer simulations in science education. We discuss three studies of the use of science simulations for undergraduate distance learning students. The first one, The Driven Pendulum simulation is a computer-based experiment on the behaviour of a pendulum. The second simulation, Evolve is concerned with natural selection in a hypothetical species of a flowering plant. The third simulation, The Double Slit Experiment deals with electron diffraction and students are provided with an experimental setup to investigate electron diffraction for double and single slit arrangements. We evaluated each simulation, with 30 students each for The Driven Pendulum and Evolve simulations and about 100 students for The Double Slit Experiment. From these evaluations we have developed a set of the features for the effective use of simulations in distance learning. The features include student support, multiple representations and tailorability.

Blumenstein, L., & Oder, N. (2007). San Jose SLIS Embraces Second Life. Library Journal, 132(11), 17. doi: Book Review.

Abstract: This article discusses how the School of Library & Information Science (SLIS) at San Jose State University, California is embracing web-based virtual reality environments, such as Second Life. A summer 2007 class in Immersive Environments will be the first to devote itself to the phenomenon. SLIS has had a presence in Second Life since 2006 when a Soros Foundation grant enabled it to buy a 16-acre site to create an "information island."

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Boulos, M. N. K., Hetherington, L., & Wheeler, S. (2007). Second Life: an overview of the potential of 3-D virtual worlds in medical and health education. Health Information and Libraries Journal, 24, 233-245. doi: 10.1111/j.1471-1842.2007.00733.x.

Abstract: This hybrid review-case study introduces three-dimensional (3-D) virtual worlds and their educational potential to medical/health librarians and educators. Second life (http://secondlife.com/) is perhaps the most popular virtual world platform in use today, with an emphasis on social interaction. We describe some medical and health education examples from Second Life, including Second Life Medical and Consumer Health Libraries (Healthinfo Island—funded by a grant from the US National Library of Medicine), and VNEC (Virtual Neurological Education Centre—developed at the University of Plymouth, UK), which we present as two detailed `case studies'. The pedagogical potentials of Second Life are then discussed, as well as some issues and challenges related to the use of virtual worlds. We have also compiled an up-to-date resource page (http://healthcybermap.org/sl.htm), with additional online material and pointers to support and extend this study.

Bowman, D., & McMahan, R. (2007). Virtual Reality: How Much Immersion Is Enough? Computer, 40(7), 36-43. Retrieved from Academic Search Complete database.

Abstract: In this article the authors examine the use immersive virtual reality technologies. The authors note that the benefits of virtual reality systems have become numerous in regards to their use in practical applications. They discuss the use of virtual reality in training military personnel in combat tactics, noting that the technology provides a balance between classroom learning and real-world exercises. They also examine how virtual reality has been used for entertainment, citing Disney's Pirates of the Caribbean attraction. They examine what makes these immersion technologies beneficial and attempt to explain why certain applications, such as various educational ones, are more productive than others.

Boyer, D., (2009). Designing for Community: Understanding Sense of Community in Virtual Learning Environments. American Educational Research Association Annual Meeting – San Diego, CA.

Brady, K., Oliver, K., Osborne, J., (2009). Student Expectations for Teachers in Virtual School Environments. American Educational Research Association Annual Meeting – San Diego, CA.

Bricken, M. (1991). Virtual reality learning environments: potentials and challenges. ACM SIGGRAPH Computer Graphics, 25(3). 178-184.

Abstract: This paper addresses the unique characteristics of emerging Virtual Reality (VR) technology and the potential of virtual worlds as learning environments. I describe several key attributes of VR environments and discuss them in relationship to educational theory and pedagogical practice. I then identify three challenges that must be met before VR can be integrated into educational settings: cost, usability, and fear of the technology.

Bricken, M., & Byrne, C. M. (1992). Summer Students in Virtual Reality: A Pilot Study on Educational Applications of Virtual Reality Technology. University of Washington. ERIC #: A unique accession number assigned to each record in the database; also referred to as ERIC Document Number (ED Number) and ERIC Journal Number (EJ Number).ED358853. Retrieved from http://www.eric.ed.gov.

Abstract: A brief narrative description of the journal article, document, or resource.The goal of this study was to take a first step in evaluating the potential of virtual reality (VR) as a learning environment. The context of the study was The Technology Academy, a technology-oriented summer day camp for students ages 5-18, where student activities center around hands-on exploration of new technology (e.g., robotics, MIDI digital sound interfaces, multi-media, and virtual reality) during 1 week sessions. Information was gathered during a 7-week period in order to evaluate VR in terms of usefulness and appeal to students ages 10-15 and to document the students' behavior and opinions as they used VR to construct and explore their own virtual worlds. Concurrently, usability data were collected on system design issues in tailoring VR to learning applications. This report outlines the theoretical framework of the study, describes the research context, and outlines the students' VR activities. Both the pedagogical methodology in designing the students' learning experience and the observation methodology used to record and evaluate student responses are described. A summary of the results of the forced choice and open-ended questions given to the students on an opinion survey are included in the report, as well as a discussion of the observations of the students and descriptions of the virtual worlds constructed by the students. The report concludes with a preliminary evaluation of the usefulness of VR for education.

Bronack, S. C., et. al. (2008). Designing Virtual Worlds to Facilitate Meaningful Communication: Issues, Considerations, and Lessons Learned. Technical Communication, 55(3), 261-269. Retrieved from Academic Search Complete database.

Abstract: The article discusses communication within online virtual worlds, examining three characteristics important to the design of effective virtual worlds and provides recommendations on the significant and functional issues that guide communications within such virtual worlds. The authors also provide the lessons learned from those who worked on the "AET Zone" virtual world. Other topics include the thematic design of space, human behavior in online virtual reality worlds, and the promotion of presence.

Brown, J. S. (2006). New Learning Environments in the 21st Century: Exploring the Edge. Forum for the Future of Higher Education, Cambridge,, Massachusetts. Retrieved March 15, 2009, from http://net.educause.edu/ir/library/pdf/ff0604S.pdf.

Abstract: As the pace of change in the 21st century continues to increase, the world is becoming more interconnected and complex, and the knowledge economy is craving more innovation. In this environment, it is critical that we shift our focus from education to lifelong learning. Fortunately, the increasing availability of learning resources on the Internet is coinciding with the growing importance of continuous learning. John Seely Brown, visiting scholar at the University of Southern California and former chief scientist of Xerox Corporation and the director of its Palo Alto Research Center (PARC), believes that if we are willing to view learning from a new respective we will no longer be resource constrained. He describes today's

learning context that we must work within, and new learning models and forms of scholarship already under way. Brown outlines his vision of a new learningscape—one that is adapted to both the need for lifelong learning and our world of accelerating change.

Buchanan, K. (2006). Beyond attention-getters: Designing for deep engagement. Michigan State University. Retrieved from ProQuest Dissertations & Theses Database.

Abstract: Immersion can enhance the experience of playing a video game, as a player perceives the peculiarities of the new context with palpable immediacy. Immersion can also be useful for teaching, since it can lead to motivation to learn. Hence, both game designers and teachers should understand how to design for immersion. Immersion can only occur if a player or student is receptive. Receptivity is a voluntary openness to new experiences. For different players or students, different design choices may elicit different levels of receptivity. This is particularly salient in the initial five to fifteen minutes of play: the "5-15 window." An initial failure to elicit receptivity may foreclose on immersion---a player stops playing or a student stops participating. Fortunately, as an interactive medium, a video game can adapt based on player feedback. This study focused on designing for receptivity. The concepts were grounded in literature from game studies and education, and in the development of a specific educational game (Ink). A new model was developed: Actions and Identity in Games and Learning. Two phases of empirical research were conducted. First, an online survey was administered. The survey used a series of questions to construct a profile of a subject. Then it presented a subset of previews for Ink . In the Match or Mismatch experimental conditions, it presented previews that were expected to elicit high or low receptivity, respectively, based on the subject's profile. In the Random condition, the survey randomly presented previews. Finally, the survey measured receptivity in several ways. Different designs, coupled with profiling and adaptation, were expected to elicit different levels of receptivity. This inference was partially proven. In the second empirical phase, several subjects were interviewed individually about their survey responses. The subjects also played through the 5-15 windows for several recreational video games, and discussed their receptivity. The interviews were used to write case studies, which revealed much about design choices and receptivity. Finally, the broader conclusions and implications were explored, for game design, instructional design, and further research.

Bull-Hansen, C. (2007). Serious Games: Video Game Design Techniques for Academic and Commercial Communication. Thesis. Department of Informatics, University of Oslo, Norway.

Summary: Traditional academic and commercial communication sources, like schools and television, are losing ground to video games. People of all ages spend increasingly more time engaged in virtual worlds and on the Internet, and are becoming used to actively pursuing the information they want to know more about, while rejecting the old passive communication channels where information is presented, but not requested. The result is a generation in need of new ways of informing. This thesis aims to provide ways for academic and commercial communication to exist in commercially popular video games while retaining the entertainment value of the games. Thus making students learn while gaming, as well as provide means for commercial interests to reach the gamer audience. The thesis provides information and analysis of game culture, player-types, social structures, game design techniques, and how knowledge of this information can be used to create and improve academic and commercial communication in

video games. The thesis utilizes a custom made prototype, ―The Renaissance Prototype", designed for the purpose of researching and test the theories presented in this thesis.

Burbules, N. & Reese, P. (1984). Teaching logic to children: an exploratory study of ―Rocky's Boots." Berkeley, CA: Assessing the Cognitive Consequences of Computer Environments for Learning (ACCCEL), Lawrence Hall of Science, University of California.

Burdea, G. C. (2004). Teaching Virtual Reality: Why and How? Presence: Teleoperators & Virtual Environments, 13(4), 463-483. doi: 10.1162/1054746041944812.

Abstract: This article looks at the teaching aspects of virtual reality, as opposed to the use of virtual reality as a teaching tool (in virtual teaching environments). It is motivated by a perceived need for clarity, focus, and dialogue that are lacking within the VR community of developers, instructors, and end users. The market for visualization/3D computer graphics/simulations has seen a steady growth over the last decade. Yet, despite success stories in oil exploration, military training, car manufacturing, and other sectors, the VR curriculum has been fragmented and heterogeneous. The most longevity and success has been shown by programs that are designed to satisfy a societal need, such as the MOVES Institute at the Naval Postgraduate School (USA). The difficulty in adequately teaching VR may be related to the expense of setting up dedicated laboratories, and the lack of supporting textbooks in the 1990s. Yet such laboratories and books are key to gaining true understanding of the VR domain. An informal worldwide survey shows that only 3% of universities offer such courses, with half being in the USA. A listing of courses in Core (VR, VE technology) and Related (human factors, interface design, arts, architecture) areas is included in the Appendix. It is hoped that this article will spark a much-needed dialog within the VR community on ways to better teach VR to address societal needs.

Burgos, D., et. al. (2008). Building adaptive game-based learning resources: The integration of IMS Learning Design and <e-adventure>. Simulation & Gaming, 39(3), 414-431. doi: 10.1177/1046878108319595.

Abstract: IMS Learning Design (IMS-LD) is a specification to create units of learning (UoLs), which express a certain pedagogical model or strategy (e.g., adaptive learning with games). However, the authoring process of a UoL remains difficult because of the lack of high-level authoring tools for IMS-LD, even more so when the focus is on specific topics, such as educational eGames. However, external tools that are not specifically IMS-LD oriented can be used. In this case, the main challenge is the integration between these external resources developed with other technologies and the personalized learning experience of an IMS-LD UoL. In this article, the authors use the project to develop conversational games that are integrated with IMS-LD UoLs to improve personalized learning. The main contribution of this setting is the integration of both parts, the IMS-LD specification and , and the communication that enables a mutual influence of the adaptive learning experience.

Burton, B., Martin, B., Thomas, D. (2009). Collaboration and the Use of Three-Dimensional Interface Within a Virtual Learning Environment. American Educational Research Association Annual Meeting – San Diego, CA.

Bush, H. (2009). Practice Makes Perfect. H&HN: Hospitals & Health Networks, 83(3), 28-30. Retrieved from Academic Search Complete database.

Abstract: The article focuses on the University of Michigan Medical School's clinical simulation center in Ann Arbor. Each simulation room can be arranged to mimic the appearance flits real-life counterpart at the hospital. It houses a wide array of mannequins for medical students to practice on. Monica Lypson, assistant dean of graduate medical education, says simulation centers will become mainstream and schools will have to make a choice of developing their own center or using somebody else's.

Business Week (2006). My Virtual Life. Retrieved November 24, 2007, from BW Magazine Web site: http://www.news.com/1606-2_3-6127686.html

Byrne, C. M. (1996). Water on Tap: The Use of Virtual Reality as an Educational Tool. Doctoral Dissertation. University of Washington. Retrieved May 7, 2009, from ftp://ftp.hitl.washington.edu/pub/publications/dissertations/Byrne/home.html.

Abstract: A study was conducted that explored Virtual Reality (VR) as an educational tool. High school students created water molecules in an immersive virtual environment. They were tested on their knowledge of atomic and molecular structure before and after their VR experience. These results were compared to the test results of students who experienced other educational media in learning the same topic. The other media differed from VR in terms of immersion and interactivity. Interactivity was found to be significant, while immersion was found to be insignificant. Issues of training, world design, assessment, hardware resolution, and student population were suggested as possible reasons for immersion's lack of significance in this study.

Byrne, C., & Furness, T. A. (1994). Virtual Reality and Education. In Proceedings of the IFIP TC3/WG3.5 International Working Conference on Exploring a New Partnership: Children, Teachers and Technology (pp. 181-189). Elsevier Science Inc. Retrieved March 18, 2009, from http://portal.acm.org/citation.cfm?id=647119.717198.

Calongne, C. M. (2008). Educational Frontiers: Learning in a VIRTUAL WORLD. Educause Review, 43(5), 36-48. Retrieved from Academic Search Complete database.

Abstract: The article focuses on the significance of virtual worlds in improving student performance in the U.S. It says that virtual worlds are engaging and stimulating spaces where students can meet online for normal class activities including lectures, discussions, case studies, research projects, and examinations. It likewise notes that a virtual world class differs from a traditional course management system due to the three-dimensional (3D) graphical setting, the use of avatars to represent the class participants, and the sense of presence that puts the learner within the scene. In addition, the use of virtual worlds expands on the campus-based and online classrooms, while enhancing learning experiences.

Cobb, S. & Stanton, D. F. (2005). Multimedia Learning in Virtual Reality. In R. E. Mayer (Ed.), The Cambridge Handbook of Multimedia Learning (pp. 525-548). Cambridge, UK: Cambridge University Press.

Cameron, D. (2001). Playing Serious Games in Journalism Classes. AsiaPacific MediaEducator.

Abstract: Explores how training simulations may need to become more sophisticated and media rich in order to stimulate and engage students. Considers that one possible interface between journalism simulations and technology is the area of video games. Defines four basic characteristics of a computer game. Presents two scenarios for implementing these ideas.

Carpenter, A. & Windsor, H. (June 2006). Ahead of the Game? Games in Education, *Serious Games Source*. Retrieved April 15, 2009 from http://seriousgamessource.com/features/feature_061306_ahead_of_the_game.php.

Carpenter, R. C., Lundell, V., & Rubin, B. (2007). Serious Games in the Global Affairs Classroom: Student Impressions of Pax Warrior as an Active Learning Tool. Journal of Information Technology & Politics, 4(2), 117-129. doi: 10.1080/19331680802076181.

Abstract: Online simulations are becoming increasingly popular in international affairs education, and a new wave of social learning games or serious games are now being marketed to global affairs instructors. While few studies empirically evaluate the effectiveness of such games in augmenting traditional classroom methods, it is often assumed that such use of IT significantly enhances students' engagement with political and social issues. We explored this assumption through a qualitative analysis of student Blackboard commentary after playing the game Pax Warrior as a supplement to a genocide prevention module in a graduate policy classroom. Student comments were coded for evidence of substantive engagement, for whether the game tended to engender critical thinking or cynicism, and for student reactions to the game itself. While evidence is mixed and further study is necessary, on balance our analysis suggests that online simulations such as Pax Warrior may indeed provide a valuable means to encourage active learning in the global affairs classroom.

Carron, T., Marty, J., & Heraud, J. (2008). Teaching with game-based learning management systems: Exploring a pedagogical dungeon. Simulation & Gaming, 39(3), 353-378. doi: 10.1177/1046878108319580.

Abstract: The work reported here takes place in the educational domain. The authors propose a learning environment based on a graphical representation of a course. The emergence of online multiplayer games led the authors to apply the following metaphor to the digital work environments: The method of acquiring knowledge during a learning session is similar to the exploration of a dungeon, where each student collects knowledge related to a learning activity. In the first part of this article, the authors focuses on a description of how concepts of learning activities can be represented in the dungeon view. The second part deals with the support of the observation task for the teacher during a learning session and more generally with providing users with awareness. The authors thus propose a multiagent system using data collected from traces resulting from the collaborative learning activity. Finally, this environment allowed the authors to set up experiments with students at their university.

Carter, C. (2009). The Panhellenic Project: Assessing Learning Engagement Using Web 2.0 Technologies. American Educational Research Association Annual Meeting – San Diego, CA.

Castaneda, R. (2008). The impact of computer-based simulation within an instructional sequence on learner performance in a Web-based environment. Arizona State University. Retrieved from ProQuest Dissertations & Theses Database.

Abstract: The purpose of this study was to investigate the impact on learner performance as measured through knowledge gain when using two forms of the same simulation, pure and impure, implemented either before or after instruction within a Web-based environment. The effect of the two types of simulation on learner attitudes about computers and online learning also was examined. Web-based instructional modules on basic computer networking concepts were used by two hundred and twenty six college students from the College of Education at Arizona State University as part of the study. A pretest-posttest control group experimental design with five conditions formed the research design. All subjects completed two online questionnaires. One questionnaire consisted of questions centered on demographic information, such as participant gender and age. The second questionnaire consisted of questions about subject attitudes, comfort with, and access to technology. Responses to the attitude questions were charted on a Likert-type scale ranging from 1=strongly disagree to 7=strongly agree. As the third pre-assessment, an online multiple-choice pretest about the networking instructional module was administered to all the subjects. The results of this study showed that regardless of what type of computer-based simulation if used after online instruction is more effective on learner's performance (knowledge gain) when compared with online instruction with no simulation. Also this study found a greater increase in knowledge gain when the simulation was used after online instruction than did the pure simulation used before the online instructional module. The difference in learner attitude about computers and online instruction between and among the simulation conditions and the no simulation condition was non-significant. However, the results of this study showed a small positive gain on student attitudes regarding computers and online instruction regardless of condition to which each had been assigned. These results confirmed findings reported from previous studies. The educational benefits of computer-based simulations are not automatically gained. Educators and instructional designers should consider the simulation's place on the instructional sequence, the subject content and the learning outcome when designing online instruction in a Web-based environment.

Castillo, F. (2007). The effects of playing videogames: What do designers want? OECD Expert Meeting on Videogames and Education. OECD-CERI. Retrieved May 16, 2009, from http://www.oecd.org/dataoecd/0/43/39530650.pdf.

Cavanaugh, C. (2004). Development and management of virtual schools: issues and trends. Hershey PA: Information Science Pub.

Description: Virtual schools are a result of widespread changes in knowledge about learning, in available technology and in society. Virtual schooling is growing in popularity and will continue to attract students because of the benefits it offers over traditional schooling. Stakeholders in virtual schools need information to guide their decisions. For the foreseeable future, virtual schools will continue to meet diverse student needs, and to evolve in response to

further change. This brings together knowledge of virtual schools as a reference for scholars and other groups involved in virtual schools. The chapters review best practice from concept and development, through implementation and evaluation.

CGames 2007 (2007). 11th International Conference on Computer Games: AI, Animation, Mobile, Educational & Serious Games. Retrieved November 24, 2007, from: http://www.scit.wlv.ac.uk/gamecentre/cgames07_lar/index.html

Chang, J. (2003). Use of business simulation games in Hong Kong. Simulation & Gaming, 34(3), 358. Retrieved from Academic Search Complete database.

     Abstract: Presents a study which examined the use of business games in the learning experience of students in universities and colleges in Hong Kong, China. Statistics on the use of computer simulations in Hong Kong; Name of simulations in each discipline; Discussion on the usefulness of computer simulations.

Chang, J., Lee, M., Kwan-Ling Ng, & Ka-Leung Moon. (2003). Business simulation games: The Hong Kong experience. Simulation & Gaming, 34(3), 367. Retrieved from Academic Search Complete database.

     Abstract: Deals with a study which evaluated the usefulness of computer simulation games to business education in Hong Kong, China. Use of Thavikulwat's DEAL: A Business Gaming Simulation program; Assessment of the understanding of students about business enterprises; Benefits of the DEAL simulation game.

Chazerand, P. (2007). Skills acquisition and knowledge appropriation through computer and videogames. Power Point presentation. OECD Expert Meeting on Video Games and Education. Santiago, Chile: OECD-CERI. Retrieved May 16, 2009, from http://www.oecd.org/dataoecd/0/42/39530631.pdf.

Clarke, J., Dukas, G. (2009). Studying the Potential of Virtual Performance Assessments for Measuring Student Achievement in Science. American Educational Research Association Annual Meeting – San Diego, CA.

Clark, M. (2009, June). Genome Island: A Virtual Science Environment in Second Life. *Innovate* - Special Issue on Virtual Worlds and Simulations. Retrieved August 21, 2009, from http://innovateonline.info

Claro, M. (2007). Video Games and Education: Background Paper. OECD Expert Meeting on Videogames and Education. Santiago, Chile: OECD-CERI. Retrieved May 16, 2009, from http://www.oecd.org/dataoecd/14/60/39548100.pdf.

CMU (2007). Alice. Retrieved November 24, 2007, from Carnegie Mellon University Web site: http://www.alice.org.

Cnet (2006). W Hotel's new Aloft chain to debut in Second Life (video). Retrieved November 24, 2007, from CNET Web site: http://www.news.com/1606-2_3-6127686.html

Coffman, T., & Klinger, M.B. (2008). Utilizing Virtual Worlds in Education: The Implications for Practice. International Journal of Social Sciences, 2(1). Retrieved March 6, 2009, from http://itecideas.pbwiki.com/f/Coffman+Klinger+Util+Virt+worlds+in+Education.pdf.

Abstract: Multi User Virtual Worlds are becoming a valuable educational tool. Learning experiences within these worlds focus on discovery and active experiences that both engage students and motivate them to explore new concepts. As educators, we need to explore these environments to determine how they can most effectively be used in our instructional practices. This paper explores the current application of virtual worlds to identify meaningful educational strategies that are being used to engage students and enhance teaching and learning.

Cohen, S. (2006). Virtual decisions: digital simulations for teaching reasoning in the social sciences and humanities. Mahwah N.J.: L. Erlbaum Associates.

Description: Developments in digital technologies--and in understandings of how best to use them--have altered teaching and learning environments, and stand to do so even more rapidly in the future. Virtual Decisions: Digital Simulations for Teaching Reasoning in the Social Sciences and Humanities focuses on the special issues related to the use of digital technologies in teaching the complex nature of social decisions, with particular attention to the use of digital role-play simulations as a means to accomplish this. With the advent of new technologies for delivering multimedia simulations to students, and advanced graphics capabilities to create life-like decision environments, digital role-play simulations are increasingly available for K-12 and higher education teachers to use in the classroom. This book helps both users and developers make intelligent choices about the value added by using simulations, technology, and media to teach reasoning in social sciences and humanities classrooms. The book relies on a four-part framework for developing a digital multimedia-based simulation approach, which represents: a cross-disciplinary method to describing simulations; the students who are using them; the educational setting in which they are used; and a rubric for assessing learning. The volume is divided into two parts. The first part presents a review of the theory and research detailing why didactic approaches do not or cannot address specific learning goals, as well as a description of the theoretical framework for using and developing simulations. The second part includes chapters on specific digital simulations and how they fit with the theoretical framework. Virtual Decisions fills a significant gap in the existing literature of instructional technology and is of interest to instructors, primarily in the social sciences and humanities, who are potential users of the simulations. It is also a resource for graduate students and pre-service teachers studying simulation design.

Collins, C. (2008). Looking to the Future: Higher Education in the METAVERSE. Educause Review, 43(5), 51-63. Retrieved from Academic Search Complete database.

Abstract: The article focuses on the impact of the rapidly-growing virtual environments on the educational system in the U.S. It says that the emergence of the Internet and social media services, that connect an ever-growing population through online communities, have given colleges and universities a broad range of services and easy access to information for their students. Meanwhile, it notes that the most obvious and early incentive for businesses to become involved in virtual worlds was the opportunity to market their services to a highly sough-after

demographic. Unlike the Internet, which is based on standardized protocols that work across many platforms, virtual worlds technology presently is still largely based on closed proprietary systems.

Conklin, M. (2007). 101 Uses for Second Life in the College Classroom. Retrieved November 24, 2007, from Elon University Web site: http://www.googlesyndicatedsearch.com/u/elonphoenix?q=second+life&sitesearch=elon.edu

Cromby, J.J., Standen, P.J., & Brown, D. J. (2007). The potentials of virtual environments in the education and training of people with learning disabilities. Journal of Intellectual Disability Research, 40(6). 489-501. doi: 10.1111/j.1365-2788.1996.tb00659.x

Abstract: The expansion of 'care in the community' has highlighted the need for more effective educational and training media for people with learning disabilities, and this paper suggests that virtual environments (VEs) may help to meet this need. Firstly, key terms (virtual environment, cyberspace and artificial reality) are defined. Secondly, aspects of developmental and cognitive psychological theories and principles of computer-assisted learning are presented that suggest that VEs might be an especially valuable educational media for people with learning disabilities. Thirdly, the existing literature in this field is reviewed. Fourthly, ethical issues associated with the use of VE, both generally and specifically by people with learning disabilities are discussed. Fifth, possible future developments of VEs, both in education and through the convergence with technologies of miniaturization, are suggested. It is concluded that VEs are an effective, affordable, accessible and safe training and educational media for people with learning disabilities, although further research will be required to realise their full potentials.

CyberOne (2007). Harvard in Second Life. Retrieved November 24, 2007, from Harvard University CyberOne: Law in the Court of Public Opinion Web site: http://blogs.law.harvard.edu/cyberone/

Daniels, L., Borchert, O., Hokanson, G., Clark, J., Saini-Eidukat, Schwert, D., Slator, B., Terpstra, J. (2009). Effects of Immersive Virtual Environments on Student Achievement and Confidence. American Educational Research Association Annual Meeting – San Diego, CA.

David, M., & Chen, S. (2005). Serious Games: Games That Educate, Train, and Inform. Boston: Thomson.

Davidson, D. (2004). Second generation e-learning: serious games. On The Horizon Series. Bradford, England: Emerald.

Contents: Introduction -- Why create a media and game center? -- The four slates of educational experiences -- Practical barriers in using educational computer games -- Making visible: using simulation and game environments across disciplines -- Visual literacy and learning: finding some online territories for the slow learner -- Games/gaming/simulation in a new media (literature) classroom -- Cyborg dreams: from ergodics to electracy -- Proposal for educational software development sites: an open source tool to create the learning software we need.

Davidson, D. (2008). Beyond fun: serious games and media. Pittsburgh, PA: ETC Press.

Summary: This book focuses on strategies for applying games, simulations and interactive experiences in learning contexts. The contributors orchestrated this collection together, reading and writing as a whole so that concepts resonate across articles. Throughout, the promises and problems of implementing games and media in learning experiences are explored. The articles have been authored by Clark Aldrich, Ian Bogost, Mia Consalvo, William Crosbie, Drew Davidson, Simon Egenfeldt-Nielsen, Melinda Jackson, Donna Leishman, Michael Mateas, Marc Prensky, Scott Rettberg, Kurt Squire, David Thomas, Siobhan Thomas, Jill Walker Rettberg, and Jenny Weight.

Deatz, R. C. & Campbell, C. H. (2001). Application of cognitive principles in distributed computer-based training. Alexandria, VA: Armored Forces Research Unit, US Army Research Institute for the Behavioral and Social Sciences. Retrieved May 4, 2009 from http://www.hqda.army.mil/ari/pdf/RP2001-03.pdf.

Abstract: As the U.S. Army continues to develop more powerful and complex digital information systems, it is essential that both training needs and training opportunities are addressed to meet mission objectives. One way to address the training challenges of emerging digital systems is through the use of computer-based instruction (CBI), particularly because of the flexibility it offers in the way training can be delivered (e.g., embedded, distance learning, Internet). Another way is to improve learning by applying principles of cognitive psychology to the training design. This paper describes a research and development effort that incorporated a limited set of cognitive learning principles and techniques in the design of CBI for individual digital operator skills. To demonstrate the design features, four prototype training modules were developed for the Force XXI Battle Command Brigade and Below (FBCB2), the Army's vehicle-mounted digital system for distributing information to provide situational awareness. This paper describes how the selected instructional techniques and cognitive principles were used in distributed computer-based…

Dede, C. (1992, May). The future of multimedia: Bridging to virtual worlds. *Educational Technology*, *32*, 5, 54-60.

Dede, C. (2009). Immersive Interfaces for Engagement and Learning. Science, 323(5910), 66-69. Retrieved from Academic Search Complete database.

Abstract: Immersion is the subjective impression that one is participating in a comprehensive, realistic experience. Interactive media now enable various degrees of digital immersion. The more a virtual immersive experience is based on design strategies that combine actional, symbolic, and sensory factors, the greater the participant's suspension of disbelief that she or he is "inside" a digitally enhanced setting. Studies have shown that immersion in a digital environment can enhance education in at least three ways: by allowing multiple perspectives, situated learning, and transfer. Further studies are needed on the capabilities of immersive media for learning, on the instructional designs best suited to each type of immersive medium, and on the learning strengths and preferences these media develop in users.

Dede, C. (n.d.) The Evolution of Constructivist Learning Environments: Immersion in Distributed, Virtual Worlds. Retrieved March 5, 2009, from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.93.2570&rep=rep1&type=pdf.

Dede, C., Salzman, M.C., & Bowen Loftin, R. (1996). ScienceSpace: virtual realities for learning complex and abstract scientific concepts. Virtual Reality Annual International Symposium, 1996., Proceedings of the IEEE 1996. pp. 246-252, 271. doi: 10.1109/VRAIS.1996.490534

   Abstract: Three virtual worlds have been built to investigate the effect of immersive, multisensory computer-generated experiences on learning topics in science. Currently targeted at high school and beginning college students, these worlds address Newtonian mechanics, electrostatics, and molecular structure and dynamics. Data has been collected on usability and learning through questionnaires, pre- and post-tests, in situ prediction and experiment and post-session interviews. The results are not uniformly conclusive but suggest that students can improve their mastery of abstract concepts through the use of virtual environments that have been designed for learning. Moreover, usability studies have identified many significant problems that have been addressed in successive refinements of these worlds. Future work will include collaborative learning studies (both local and distant), use of intelligent agents, and comparison with two-dimensional microworlds.

Dede, C., Salzman, M., Loftin, B., & Ash, K. (1997). Using virtual reality technology to convey abstract scientific concepts. To appear in M. J. Jacobson & R. B. Kozma (Eds.), Learning the Sciences of the 21st Century: Research, Design, and Implementing Advanced Technology Learning Environments. Hillsdale, NJ: Lawrence Erlbaum. Retrieved April 27, 2009 from http://virtual.gmu.edu/ss_pdf/jacobson.pdf.

   Abstract: To help in understanding the advanced learning tools we are developing, this chapter begins with a brief introduction to our worlds and to the virtual reality technology upon which they are built. We then describe our learner-centered strategy for design and evaluation and identify issues that have shaped the development and assessment of our immersive, multisensory environments. Next, we discuss the evolution and evaluation of each ScienceSpace world. Finally, we describe insights gained both about learning and about emerging educational technologies such as virtual reality, then delineate our plans for future research.

Dede, C., Salzman, M. C., Loftin, R. B. & Sprague, D. (1999) Multisensory Immersion as a Modeling Environment for Learning Complex Scientific Concepts. In W. Feurzeig and N. Roberts (Eds.), Computer Modeling and Simulation in Science Education. NY: Springer. Retrieved April 27, 2009 from http://virtual.gmu.edu/ss_pdf/feurzeig.pdf.

Devane, B., Durga, S., Squire, D. (2009). ―Economists Who Think Like Ecologists": Analyzing Critical Systems Thinking in a Game-Based Learning Environment. American Educational Research Association Annual Meeting – San Diego, CA.

Developing Simulations. (2004). Online Classroom, 1-2. Retrieved from Academic Search Complete database.

Abstract: Describes the educational clinical simulations created by Randy de Kler, program manager of respiratory care at Hillsborough Community College in Florida. Defining, mapping and recreating the environment or situation to be simulated; Use of notecards to map the simulation; Powerpoint slides; Activation of hyperlinks.

De Lara, J., & Alfonseca, M. (2001) Using Simulation and Virtual Reality in Distance Education. In Ortega, M. & Bravo, J. (Eds.) Computers and Education: Towards an Interconnected Society. (pp. 199-207). Springer.

Abstract: This paper describes the construction of virtual reality simulations for distance education through the Internet. This is accomplished by means of an object oriented continuous simulation language, called OOCSMP, and a Java generating compiler for this language called C-OOL. This compiler is also able to create VRML worlds. The behaviour of the VRML world is specified in the OOCSMP models. Change of simulation parameters is possible at run time by means of a Java interface, generated by the compiler. An example of the simulation of the inner Solar System is presented.

Delwiche, A. (2008). Powerful But Not a Panacea: Virtual Worlds as a Tool for Situational Learning. ELI Web Seminar, February 2008.

Summary: Once relegated to the fringes of the games industry, virtual worlds such as Second Life are now viewed as a promising instructional platform. College instructors use this emerging technology to teach courses on topics ranging from architecture and anthropology to history, literature and computer programming, and a growing number of Fortune 500 companies conduct employee training in virtual worlds. In 2007 alone, educational institutions were responsible for the creation of more than 1,200 islands in Second Life. While many educators are excited about the potential of virtual worlds, others are deeply wary. Some fear that virtual worlds are a faddish technology that actually degrades student learning. In this presentation, Professor Aaron Delwiche of Trinity University suggests that there are grounds for both enthusiasm and skepticism. Virtual worlds are certainly not an educational panacea, and they present many challenges for students, instructors, and administrators. When coupled with thoughtful strategies grounded in situated learning theory, however, these emerging technologies can be very powerful educational tools.

Dettori, G., Giannetti, T., Vaz, A., & Paiva, A. (2006). Technology-mediated narrative environments for learning. Rotterdam: Sense Publishers.

Summary: Narrative has always been used as a means for learning, both in school and in informal contexts. Technology has further increased the possibilities of exploiting its potential for education. Is there an added value, though, in using technology to realize narrative learning experiences? And what are the advantages of embedding narrative in technology-based learning environments? Addressing such questions is the aim and focus of this volume. The book includes 12 chapters analyzing different ways of building and using technology-mediated narrative learning environments or highlighting aspects that can help the reader gain a deeper understanding of their educational potential. The focus is not limited to cognition, but includes also motivation and emotion, which are important components of learning. The book originates from the work of the Special Interest Group 'Narrative and Learning Environments' of the

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Kaleidoscope Network of Excellence. It is addressed to teachers, educators, parents, cultural operators, researchers and software designers, and aims to help all of them increase their ability to exploit, appreciate and enjoy their work with technology-mediated narrative learning environments.

De Waard, D., et al. (2003). Human Factors in the Age of Virtual Reality. Maastricht, Netherlands: Shaker Publishing. Link: http://www.hfes-europe.org/books/vrbk.htm

Di Blas, N., Paolini, P., & Hazan, S. (2003). The SEE Experience: Edutainment in 3D Virtual Worlds. Museums and the Web 2003: Selected Papers from an International Conference (7th, Charlotte, NC, March 19-22, 2003). Retrieved March 5, 2009, from http://eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/1b/87/4d.pdf

Abstract: Shared virtual worlds are innovative applications where several users, represented by Avatars, simultaneously access via Internet a 3D space. Users co-operate through interaction with the environment and with each other, manipulating objects and chatting as they go. Apart from in the well-documented online action games industry, now often played out in real-time over the Internet, the success stories of virtual worlds and shared VRML environments have been sporadic. Interest wanes from an enthusiastic beginning: the 3D world looks both enticing and promising, but the attention curve drops sharply as the users find the space either too difficult to navigate or not satisfyingly engaging. The key to the success or failure of these environments relates directly to the content offered and the ability of the environment to hold a critical mass of users in real time. This is the desperately sought after magic social glue that determines the experience to be meaningful and actively keeps the users under its virtual spell. The paper will present an innovative project, a shared virtual world geared to schools in an educational and highly structured,environment. SEE, Shrine Educational Experience, is a co-operative project developed jointly by Shrine of the Book at the Israel Museum, Jerusalem, and the Politecnico di Milano, Italy, offering a pioneering educational environment based on a shared 3D virtual world, where classes from all over the world meet in order to learn and discuss issues related to the famous Dead Sea Scrolls and the tiny community (probably of Essenes) who once lived by the Dead Sea.

Dickey, M. D. (1999). 3D Virtual Worlds and Learning: An Analysis of the Impact of Design Affordances and Limitation in Active Worlds, Blaxxun Interactive, and OnLive! Traveler; and a Study of the Implementation of Active Worlds for Formal and Informal Education. Doctoral dissertertation, Ohio State University. Retrieved March 5, 2009, from http://mchel.com/Papers/Dickey-Dissertation.pdf.

Abstract: Within this decade there has been a proliferation of computer technologies that allow users to communicate and collaborate over time and space. These emerging technologies have had a great and resounding impact on the field of education by not only influencing practices within the classroom, but by expanding and challenging our notions of how we learn. During the past few years, educators have begun to experiment with the use of text-based virtual worlds to both supplement and expand classroom practices. While text-based virtual worlds offer many unique opportunities for collaborative and cooperative learning, they lack the visual opportunities afforded by such technologies as virtual reality. 3D virtual worlds represent an emerging technology that offers the communicative opportunities of text-based virtual worlds,

but with a 3D environment that provides a visual representation of space and place for users to interact within. This thesis is a two-part study into the design and implementation of 3D virtual worlds for educational purposes. Part one of this study provides an analysis of the impact of design affordances and limitations of three popular 3D virtual worlds (Active Worlds, blaxxun interactive, and OnLive! Traveler) by addressing the way the user is constructed. This study relied on the use grounded theory methodology to analyze the various design features that serve to construct presence, representation, and embodiment of users. The findings indicated that although all three 3D virtual worlds had roughly comparable design affordances and limitations, each functions in different ways. In turn, it was revealed that these three worlds provide interesting and different potential as learning environments. Part two of this study is an investigation of how Active Worlds is currently being used for both informal and formal education. The two case studies provided in this investigation are an AW object modeling class offered by Active World University (informal) and an undergraduate business-computing course offered by the University of Colorado–Boulder College of Business (formal). Findings revealed that in both case studies the use of a 3D virtual world provided unique learning opportunities that would be difficult to replicate in a physical classroom. Implications of this study can be applied to the design, practice, and future research of the educational use of 3D virtual worlds.

Dickey, M. D. (2004). An architectural perspective for the design of educational virtual environments. Journal of Visual Literacy, 24(1), 49-66.

Abstract: Three-dimensional virtual worlds are a new technology being used as learning environments, however problems associated 3D virtual environments such as student feelings of disorientation and problems wayfinding may impact learning. This interpretive case study investigates using an architectural perspective for design. The setting for this case study is a distance learning course using the virtual world application Active Worlds as a setting. Methods of data collection include participatory observations, formal interviews with course designers, and informal interviews with participants. Findings revealed the inclusion and placement of architectural objects and elements helped students to identify places, relocate previously visited places and supported the construction of cognitive maps for the learners.

Dickey, M. D. (2005). Brave new (Interactive) worlds: A review of the design affordances and constraints of two 3D virtual worlds as interactive learning environments. Interactive Learning Environments, 13(1-2), 121-137.

Abstract: Three-dimensional virtual worlds are an emerging medium currently being used in both traditional classrooms and for distance education. Three-dimensional (3D) virtual worlds are a combination of desk-top interactive Virtual Reality within a chat environment. This analysis provides an overview of Active Worlds Educational Universe and Adobe Atmosphere and the pedagogical affordances and constraints of the inscription tools, discourse tools, experiential tools, and resource tools of each application. The purpose of this review is to discuss the implications of using each application for educational initiatives by exploring how the various design features of each may support and enhance the design of interactive learning environments.

Dickey, M. D. (2002). Constructing the User: The Impact of the Design of Three-dimensional Virtual Worlds on User Representation. Proceedings of AECT 2002, Dallas, TX, November 2002. Retrieved April 23, 2009 from http://mchel.com/Papers/Dickey-ConstructingtheUser2.pdf.

Abstract: This past decade has ushered in an era of new forms of communities. Three-dimensional virtual worlds are among the latest offerings of networked communities for spatially distant users to meet and interact. Unlike chat, newsgroups, and discussion forums, three-dimensional virtual worlds provide multiple means of self-representation within a virtual environment. However, like all computer-mediated environments, the design to varying degrees constructs the user. This investigation presents an exploratory case study of how Active Worlds constructs the user in the virtual environment. This case study relied heavily on participatory observations and interactions with other users in Active Worlds. During iterative cycles of observation and interaction, the three categories of presence, representation, and embodiment emerged. The findings reveal that value is placed on the development and autonomy of individual communities, however, a little value is placed on the user as an individual. While more research is necessary to explore fully the potential of 3D virtual worlds for specific purposes, this initial investigation revealed that values embedded in the design of an application impact how a user is constructed in a 3D environment.

Dickey, M. D. (2007). The Design of a Game-based Learning Environment: Murder on Grimm Isle. Paper presented at the annual meeting of the annual meeting of the American Educational Research Association. Chicago, IL.

Dickey, M. D. (2005). Engaging by design: How engagement strategies in popular computer and video games can inform instructional design. Educational Technology Research and Development, 53(2), 67-83.

Abstract: Computer and video games are a prevalent form of entertainment in which the purpose of the design is to engage players. Game designers incorporate a number of strategies and tactics for engaging players in ―gameplay." These strategies and tactics may provide instructional designers with new methods for engaging learners. This investigation presents a review of game design strategies and the implications of appropriating these strategies for instructional design. Specifically, this study presents an overview of the trajectory of player positioning or point of view, the role of narrative, and methods of interactive design. A comparison of engagement strategies in popular games and characteristics of engaged learning is also presented to examine how strategies of game design might be integrated into the existing framework of engaged learning.

Dickey, M. D. (2007). Game design and learning: a conjectural analysis of how massively multiple online role-playing games (MMORPGs) foster intrinsic motivation. Educational Technology Research and Development, 55(3), 253-272.

Abstract: During the past two decades, the popularity of computer and video games has prompted games to become a source of study for educational researchers and instructional designers investigating how various aspects of game design might be appropriated, borrowed, and re-purposed for the design of educational materials. The purpose of this paper is to present an analysis of how the structure in massively multiple online role-playing games (MMORPGs)

might inform the design of interactive learning and game-based learning environments by looking at the elements which support intrinsic motivation. Specifically, this analysis presents (a) an overview of the two primary elements in MMORPGs game design: character design and narrative environment, (b) a discussion of intrinsic motivation in character role-playing, (c) a discussion of intrinsic motivational supports and cognitive support of the narrative structure of small quests, and (d) a discussion of how the narrative structure of MMORPGs might foster learning in various types of knowledge.

Dickey, M. D. (2006). Game design narrative for learning: Appropriating adventure game design narrative devices and techniques for the design of interactive learning environments. Educational Technology Research and Development, 54(3), 245-263.

Abstract: The purpose of this conceptual analysis is to investigate how contemporary video and computer games might inform instructional design by looking at how narrative devices and techniques support problem solving within complex, multimodal environments. Specifically, this analysis presents a brief overview of game genres and the role of narrative in popular adventure game design, along with an analysis of how narrative supports problem solving in adventure games. Additionally, an analysis of the underlying structure used in game design for developing narratives is presented along with design heuristics for constructing narratives for educational purposes.

Dickey, M. D. (2003). An investigation of computer gaming strategies for Engaged Learning. Paper presented at the annual meeting of the American Educational Research Association. Chicago, IL.

Dickey, M. D. (2006). ―Ninja Looting" for Instructional Design: The Design Challenges of Creating a Game-based Learning Environment. Paper presented at the annual meeting of SIGGRAPH. Boston, MA. Retrieved April 23, 2009 from http://mchel.com/Papers/Dickey_Educators_0135_Paper.pdf.

Abstract: Computer and video games have become an increasingly prevalent form of entertainment. While the primary purpose of games is entertainment, the underlying design employs a variety of strategies and techniques which require players to analyze, synthesize, and to use critical thinking skills. Ironically, these are also many of the same types of critical thinking skills educators and instructional designers attempt to foster when creating educational materials and media. The purpose of this paper is to present an overview of a 3D game-based learning environment and to highlight some of the issues that arose during the design, development, and production. Specifically, this paper presents (a) game design elements which can be appropriated (looted) from game design, (b) cognitive research that supports the integration of the elements for instructional design, (c) a discussion of challenges encountered while creating a 3D game-based learning environment with limited resources, and (d) various low-cost and free resources (to avoid ninja looting).

Dickey, M. (2009). The Pragmatics of Virtual Worlds for Educators: A Comparison of the Affordances and Constraints of Active Worlds and Second Life for K-12 In-Service Teachers. American Educational Research Association Annual Meeting – San Diego, CA.

Dickey, M. D. (2003). Teaching in 3D: Pedagogical Affordances and Constraints of 3D Virtual Worlds for Synchronous Distance Learning. Distance Education, 24(1). Retrieved March 5, 2009, from http://mchel.com/Papers/Dickey_TeachingIN3D.pdf

Abstract: Three-dimensional (3D) virtual worlds are a new technology that holds some promise as constructivist learning environments for distance education. This investigation presents an evaluative case study of the pedagogical implications of using one 3D virtual world, Active Worlds, for synchronous distance education. The research design for this qualitative study focuses on the pedagogical affordances and constraints. Methods employed in the data collection include participatory observations, class logs, and formal and informal interviews with the instructor of a synchronous distance learning course offered through Active Worlds University. Findings reveal that although Active Worlds provides tools that support constructivist learning environments, the affordances and constraints of the tools (discourse, experiential, and resource) may, to varying degrees, impact the pragmatic use of this medium. While this initial investigation reveals that this technology supports constructivist learning environments, more research needs to be conducted to fully explore the potential of 3D virtual worlds as both distance and traditional classroom learning environments.

Dickey, M. D. (2005). Three-dimensional virtual worlds and distance learning: two case studies of Active Worlds as a medium for distance education. British Journal of Educational Technology, 36(3). 439-451 . Retrieved March 5, 2009, from http://mchel.com/Papers/BJET_36_3_2005.pdf

Abstract: Online three-dimensional (3D) virtual worlds are emerging technologies that offer unique learning opportunities for traditional and distributed education. One of the more popular 3D virtual worlds, Active Worlds, is currently being used as a medium for synchronous and asynchronous distance learning. This investigation presents two exploratory case studies of different, but exemplary educational activities using Active Worlds for formal and informal education. The focus of each case study is to investigate how Active Worlds is being used for distance learning and to determine the type of learning experiences afforded by this 3D virtual environment. Whilst more research is necessary to explore fully the potential of 3D virtual worlds for learning, this initial investigation illustrates how Active Worlds affords opportunities for experiential learning and situated learning within a collaboration learning environment.

Dieterle, E., Dede, C. (2009). Media-Based Learning Styles That Benefit or Undercut Learning in a Multi-User Virtual Environment. American Educational Research Association Annual Meeting – San Diego, CA.

Dill, K. E. (2007). The influence of video games on youth: Implications for learning in the new millenium. OECD Expert Meeting on Videogames and Education. OECD-CERI. Retrieved May 17, 2009, from http://www.oecd.org/dataoecd/43/61/39414891.pdf.

Di Meglio, F. (2008). Virtual Workplaces in the Classroom. Business Week Online, 23. Retrieved from Academic Search Complete database.

Abstract: In this article, the author looks at the growing popularity of computer simulations in business-school programs in the U.S. According to the author, online simulations

allow students to perform tasks such as overseeing operations management of a virtual factory or serving as chief executive of a virtual business and networking with other executives. She also indicates that professors can track every move students make in these online games and use the data to grade the students and provide feedback on specific skills.

Dondlinger, M. (2009). The Global Village Playground: Game Design as Capstone Experience. American Educational Research Association Annual Meeting – San Diego, CA.

Dormido, R., et al. (2008). Development of a Web-Based Control Laboratory for Automation Technicians: The Three-Tank System. IEEE Transactions on Education, 51(1), 35-44. doi: 10.1109/TE.2007.893356.

Abstract: This paper introduces a Web-based control laboratory for experimentation on a nonlinear multiple-input-multiple-output (MIMO) system: the three-tank plant. Using this application, automation technician students can learn in a practical way many fundamental aspects of control processes. The client-side of the virtual laboratory has been developed using the programming support provided by Easy Java Simulations (EJS), an open-source tool for teachers with limited programming skills who want to create Java applications and applets. The lab has been integrated in the collaborative Web-based experimentation environment eMersion which provides more flexibility for the students performing the laboratory experiments.

Dowell, J. (2007). Digital games and learning gains. OECD Expert Meeting on Videogames and Education. Santiago, Chile: OECD-CERI. Retrieved May 17, 2009, from http://www.oecd.org/dataoecd/44/16/39414809.pdf.

Drake, P., Klepeis, N. (2009). Using Computer Simulation to Reduce Secondhand Smoke Exposure of Children in Automobiles. American Educational Research Association Annual Meeting – San Diego, CA.

DRE at Purdue: A Distributed Rendering Environment for Teaching Animation and Scientific Visualization. (March 2006). EDUCAUSE Learning Initiative Innovations & Implementations. Retrieved April 15, 2009 from http://net.educause.edu/ir/library/pdf/ELI5009.pdf.

Duncan, S. (2009). Gamer Communities as Design Spaces. American Educational Research Association Annual Meeting – San Diego, CA.

Earnshaw, R. A., Vince, J. A., & Jones, H. (Eds.) (1995). Virtual reality applications: Proceedings of the Conference on Applications of Virtual Reality, British Computer Society. London: Academic Press.

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Virtual reality in computational neuroscience / J. Leigh... [et al.]
A unified approach to interface design for data visualization using desktop and immersion virtual environments / R.R. Dickinson and M. Jern

EC (2007). A Virtual Visit to the Sistine Chapel. Retrieved November 24, 2007, from EternallyCool Web site: http://eternallycool.net/?p=666

Eck, R. V. (2006). Using Games to Promote Girls' Positive Attitudes Toward Technology. Innovate, 2(3).

Abstract: Studies show that women make up only 35% of the IT workforce, and the schism between boys' and girls' interests in math and science is well documented. Richard Van Eck suggests that providing girls with more positive experiences with technology may impact their overall attitudes toward technology and perhaps even toward math and science. Van Eck chose games, naturally engaging experiences, as the basis of a two-semester study involving 92 fifth- and sixth-graders participating in game playing and authoring experiences in the classroom. He analyzes the differences in experience, attitude, and interest level between boys and girls. His results suggest that the use of a wide variety of games experienced in mixed gender groups may improve girls' attitudes toward technology.

Edmonds, B., Iglesias, C. H., & Troitzch, K. G. (2008). Social simulation technologies, advances, and new discoveries. Hershey PA: Information Science Reference.

Summary: "This book, a reference survey of social simulation work comprehensively collects the most exciting developments in the field. Drawing research contributions from a vibrant community of experts on social simulation, it provides a set of unique and innovative approaches, ranging from agent-based modeling to empirically based simulations, as well as applications in business, governmental, scientific, and other contexts"--Provided by publisher.

Educational Uses of Second Life. (n.d.). Second Life in Education. Retrieved April 28, 2009, from http://sleducation.wikispaces.com/educationaluses.

EDUCAUSE (2006, June). 7 Things You Should Know About Virtual Worlds. Retrieved March 13, 2009 from http://net.educause.edu/ir/library/pdf/ELI7015.pdf.

England, R., Edgar, G., & Carr, K. (1992). Human factors in virtual worlds. 2. Enabling interaction and performance. In Using Virtual Worlds, IEE Colloquium on (pp. 4/1-4/5).

Abstract: For pt.1 see ibid., p.3/1-3 (1992). The authors outline the nature of human factors (HF) research associated with the use of virtuality research (VR). While the previous paper addressed the issues of how best to represent the task from a cognitive perspective, here they focus upon the perceptual and interactive requirements that enable the human operator to complete the task. The discussion describes some of the perceptual characteristics of the human operator, how they relate to the system and task hardware, and why it is essential that they are properly understood. They present an example of VR-related HF research conducted at the Sowerby Research Centre. It is representative of the research they are conducting to increase their knowledge of the operator and to enable interaction and performance

Erlandson, B., Nelson, B. (2009). Design and Development of a Virtual World for Learning Life Skills. American Educational Research Association Annual Meeting – San Diego, CA.

Eteokleous, N., Krausz, A., Emanuel, O., Leal, Y. (2009). The Application of a Virtual-Social Curriculum: Developing Teenagers' Cultural Competency, Social, and Leadership Skills. American Educational Research Association Annual Meeting – San Diego, CA.

Evans, N., Mulvihill, T. M., & Brooks, N. J. (2008). Mediating the Tensions of Online Learning with Second Life. Innovate, 4(6).

Abstract: The future of education will be shaped by innovative online communication tools that will change both the context and the nature of the relationships that influence education. In this article, Nancy Evans, Thalia M. Mulvihill, and Nancy J. Brooks explore the educational possibilities of Second Life, a three-dimensional virtual online environment. The authors posit that a multiuser virtual enviroment such as Second Life offers a valuable medium for enhancing and enriching online education because it meets human needs for belonging, esteem, and self-actualization; complements users' motivations for engaging with technology; and aids in building relationships and personal connections in an online environment, thereby offering transformative learning and teaching opportunities.

Ezarik, M. (2008). A Virtual Visit WELCOME. (Cover story). University Business, 11(9), 26-31. Retrieved from Academic Search Complete database.

Abstract: The article discusses the emergence of online campus tour which entertains and engages virtual visitors taking a peek at various colleges and universities in the U.S. It explores the claim of Ron Reis, co-founder and digital dean of YOUniversity, that virtual tour is the most important element of a college Web site. It highlights the benefits of online tours with video and other multimedia experiences in bringing life to a campus.

Fabricatore, C. (2007). Gameplay and game mechanics design: a key to quality in videogames. OECD Expert Meeting on Videogames and Education. OECD-CERI. Retrieved May 16, 2009, from http://www.oecd.org/dataoecd/44/17/39414829.pdf.

Abstract: What makes a good game? Marketing wisdom indicates that the success or failure of a product depends mainly on how well it satisfies customers' preferences, needs and expectations. Consequently, knowing the player and his/her preferences is crucial to design successful digital games. Hence, the really important question is: what do players expect from a good game? When playing a game, players seek challenge, mastery and reward, all packed in entailing and motivating activities. From this stems the importance of gameplay as a crucial game design cornerstone, and game mechanics as tools that the player has to interact with in order to carry out gameplay activities.In this paper we analyze the relevance of gameplay and game mechanics from a playercentered perspective, and provide insights and guidelines to improve game design in order to sustain and enhance players' motivation through gameplay.

Fanning, E. (2008). Instructional design factors as they relate to the creation of a virtual learning environment. University of Virginia. Retrieved from ProQuest Dissertations & Theses Database.

Abstract: This study explored the process involved in the creation of virtual learning environments, with specific focus on the role of Instructional Systems Development (ISD) theory and its adequacy in addressing the needs unique to this multidimensional delivery system. To compare the comprehensiveness of ISD theory to application in professional practice, this study used a qualitative, multiple case study approach that involved interviews with developers of virtual environments. Cases represented a range of sectors that included academia, designers of games and entertainment, and commercial and advertising applications, and approaches that included the use of Learning Management Systems (LMS), Immersive Learning Simulations, (ILS), and a blended approach that typically involved the incorporation of webconferencing tools. Interviews were based on processes and elements integral to learning success in a virtual or distant mediated learning environment as identified in a literature review. This research indicates that 80% of those involved in the study use ISD or a similar process that integrates elements of software development. Those who do not use a process often create environments that last less than a year. This research suggests that the ISD process is adequate in providing a framework for the development of virtual learning environments, but requires adaptation to address the need for setting user expectations, the emerging role of the user as a participant and creator of the learning of the environment, and a clarified construct to encompass the terms of summative evaluation.

Ferdig, R. (2009). Handbook of research on effective electronic gaming in education. Hershey, PA: Information Science Reference.

Description: Games and gaming have always been an important part of society and culture. Within the last 35 years, due to numerous technology innovations, electronic games in many formats have not only become ubiquitous in everyday recreational life but have also permeated many professional fields and disciplines for multiple purposes including teaching and learning. The Handbook of Research on Effective Electronic Gaming in Education presents a framework for understanding games for educational purposes while providing a broader sense of current related research. Compiling over 50 groundbreaking research studies from leading international authorities in the field, this advanced and uniquely comprehensive reference is a

must-have for academic and research libraries and for all those interested in expanding their theoretical and practical knowledge of the exciting field of electronic gaming.

Ferrington, G. & Loge, K. (1992). Virtual Reality: A New Learning Environment. Computing Teacher, 19(7). 16-19.

Abstract: Discusses virtual reality (VR) technology and its possible uses in military training, medical education, industrial design and development, the media industry, and education. Three primary applications of VR in the learning process--visualization, simulation, and construction of virtual worlds--are described, and pedagogical and moral issues are raised.

Fields, D., Giang, M., Kafai, Y. (2009). Synchronizing Learning Across Time and Spaces: Trajectories of Participation in a Tween Virtual World. American Educational Research Association Annual Meeting – San Diego, CA.

Fletcher, J. D. (2009). Education and Training Technology in the Military. Science, 323(5910), 72-75. Retrieved from Academic Search Complete database.

Abstract: The United States Department of Defense (DOD) has contributed to the development of various education and training technologies, two of which are computer-assisted instruction and simulation-based instruction. DOD investment in computer-assisted instruction has continued from the 1950s to the present. Its contributions have ranged from drill and practice to computers capable of generating instructional interactions on demand and in real time. DOD investment in instructional simulation began with pilot trainers but evolved to include computer-controlled simulators serving a wide range of purposes, including simulators that are networked for collective education and the training of crews, teams, and units. Past and continuing contributions of the DOD in areas such as effectiveness, cost-effectiveness, instructional efficiency, and collaborative collective activity are worthy of attention.

Ford, M., Frederickson, A., & Martin, L. (2000). The interpretation of symbol schemes in a computational medium. Washington, DC: US Dept of Education, Office of Educational Research and Improvement, Educational Resources Information Center.

Foreman, J. (2004). Game-Based Learning: How to Delight and Instruct in the 21st Cenutry. EDUCAUSE Review, 39(5). 50-66. Retrieved March 15, 2009 from http://www.educause.edu/EDUCAUSE+Review/EDUCAUSEReviewMagazineVolume39/GameBasedLearningHowtoDelighta/157927.

Summary: Interviews with five leading-edge thinkers in the field, James Paul Gee, J. C. Herz, Randy Hinrichs, Marc Prensky, and Ben Sawyer, on the following topics:
The dysfunctions of conventional instruction
The power of simulations
The importance of game-based learning communities
The reasons videogames promise a better learning future
The changes necessary for the new paradigm to take hold
The practical steps that colleges/universities and influential academics can take to move institutions down the trail blazed by USC and others

Foreman, J. (2004). Video Game Studies and the Emerging Instructional Revolution. Innovate, 1(1).

Abstract: An additional development in learning and technology is the emergence of ―Video Game Studies"• as an academic field in higher education. While this trend may appear recent and relatively marginal, Joel Foreman's account indicates that it has already gained considerable momentum as more scholars explore the possibilities of gaming as a legitimate vehicle of pedagogy and curricular reform. After surveying the growth of this field, Foreman considers how gaming technology can allow students to construct new knowledge as they navigate through sophisticated virtual environments suited to different disciplines of study. At the same time, he concedes that further advances in this field have been compromised due to budgetary constraints faced by most higher education institutions. The future of gaming technology in higher education, Foreman argues, will largely depend on the increasing demand of students who seek to bridge the gap between their technological interests and their academic coursework. As with other innovations in technology, the primary impetus for revolutionary change will come from a new generation of learners and aspiring professionals.

Foreman, J., & Aldrich, C. (2005). The Design of Advanced Learning Engines: An Interview with Clark Aldrich. Innovate, 1(6).

Abstract: Guest editor Joel Foreman and Clark Aldrich, one of three "e-learning gurus" identified by Fortune magazine, discuss the ways that game-like simulations will eventually alter the educational landscape. Aldrich distinguishes games from simulations, outlines the types of content that good simulations must have, and provides an intriguing glimpse into the future of education in which 20 new genres of simulations may well result in an educational revolution, freeing educators to teach an abundance of subjects that currently cannot be taught in the dominant media. Aldrich is clear as well about how this future may come to be—through a large investment in time, money, research, and creative effort. The payoff for this investment is an integration of learning and doing, where school and work environments are each shaped and informed by the other.

Forum guide to elementary/secondary virtual education. (2006). Washington, DC: National Forum on Education Statistics. Retrieved May 4, 2009 from http://nces.ed.gov/pubs2006/2006803.pdf.

Foster, A. (2008). Games and Motivation to Learn Science: Personal Identity, Applicability, Relevance and Meaningfulness. Journal of Interactive Learning Research, 19(4), 597-614.

Abstract: Game-based learning and designing has become a hot topic in educational technology. It is believed that video gaming is one way to get students engaged in learning complex and ill-structured material, holistic learning, and preparing learners for 21st century jobs. However, beyond engagement, games may also be used for learning and developing personal interest in science by utilizing the affordances for personal identity, applicability beyond the school setting and for a personal agenda, and relevance and meaningfulness of scientific practices and ideas. This article, based on the synthesis of information from the games,

science education, and motivational research literatures present a focused view on how games for learning (serious games) can be designed and used for learning and developing an interest in science. The article also points in the direction of much needed research to assess the claims about games for learning.

Foster, A. L. (2007). "Immersive Education" Submerges Students in Online Worlds Made for Learning. Chronicle of Higher Education, 54(17).

Abstract: Immersive Education is a multimillion-dollar project devoted to build virtual-reality software exclusively for education within commercial and nonprofit fantasy spaces like Second Life. The project combines interactive three-dimensional graphics, Web cameras, Internet-based telephony, and other digital media. Some critics have complained that promoting video games in schools and colleges dumbs down education. Yet Immersive Education has gathered an impressive roster of backers. In addition to Boston College and Harvard University, its supporters include Amherst College, Columbia University, Massachusetts Institute of Technology, Sweden's Royal Institute of Technology, Japan's University of Aizu, the Israeli Association of Grid Technologies, NASA, Sun Microsystems, the City of Boston, and the New Media Consortium, a higher-education technology group. The Immersive Education project is about to get additional financial support from the Ewing Marion Kauffman Foundation, which promotes entrepreneurship. The foundation has agreed to provide $750,000 to the Federation of American Scientists for the development of online games and virtual environments. Part of the money will go toward developing Immersive Education software's technical specifications and documentation.

Fullerton, T., Swain, C., & Hoffman, S. (2008). Game design workshop: a playcentric approach to creating innovative games (2nd ed.). Boston: Elsevier Morgan Kaufmann.

Description: Game Design Workshop provides a step-by-step introduction to the art of designing, prototyping and playtesting innovative games that has been proven to help beginners and professionals alike.

Gallet-Blanchard, L. (2005). "VR ─Montmartre in the Jazz Age"': The Problematics of Virtual Reality in R... Literary & Linguistic Computing, 20(3), 313-325. doi: 10.1093/llc/fqi032.

Abstract: The article studies the interaction between technical choices in virtual reality (VR) models and approaches to cultural history, for teaching and research. It is based on an ongoing project undertaken by _Cultures Anglophones et Technologies de l'Information' at Paris-Sorbonne: _Montmartre in the jazz age', a modal of Montmartre in the late 1920s, when African-American musicians brought jazz to cabarets. Integrating it into the curriculum modifies the research/teaching interaction: it involves students in projects in progress; it encourages them to undertake interdisciplinary studies, involving computing skills and research in topography or music history. The issues that arise in the authoring of the project are a contribution to the problematics of cultural history; modelling the Montmartre environment from early documents (maps, photographs, which have to be edited with specialized software) shows how relative and incomplete they are—and thus how relative and composite our own modeling is. This composite character is in keeping with the _spirit of place' of a multicultural area; VR is an elaborate structure, starting from a 3D model, with interior and exterior views, wireframes and textures;

the medium is suited to the message: the recreation of a complex environment of spaces and subspaces throwing into focus contact points between French traditional songs and American jazz. The VR projects underline issues in the humanities; involving students increases their awareness of new problematics. The present article shows how new methods in humanities computing, in the field of visualization, alter and enrich humanities disciplines. It documents the authoring of a VR model, and the introduction of an Information Technology research project into the university teaching process: ‚Montmartre in the jazz age', a multidisciplinary humanities adventure involving a digital reconstruction of part of this famous...

Games, I. (2009). Playing as a Game Designer: The Role of Gamestar Mechanic in the Metacognitive Discourse of Middle School Children. American Educational Research Association Annual Meeting – San Diego, CA.

Games-to-Teach Team. (2003). Design principles of next-generation digital gaming for education. Educational Technology, 43(5), 17-33. Retrieved March 18, 2009 from http://website.education.wisc.edu/kdsquire/manuscripts/tea-acm.pdf.

Garris, R., Ahlers, R., & Driskell, J.E. (2002). Games, motivation, and learning: A research and practice model. *Simulation & Gaming*, *33*(4), 441.

Gaydos, M. (2009). PR0 or n00b: An Expert-Novice Study of World of Warcraft Players. American Educational Research Association Annual Meeting – San Diego, CA.

Gayeski, D., (ed.) (1993). Multimedia for learning: development, application, evaluation. Englewood NJ: Educational Technology Publications.

> Contents:
> Making sense of multimedia: introduction to this volume / Diane M. Gayeski
> Butcher, baker, candlestick maker: skills required for effective multimedia development / David Hon
> The hurdles of technology transfer / William B. Whitten
> Factors to consider in evaluating multimedia platforms for widespread curricular adoption / Pam Knight
> HyperCard and CD-I: the 'Mutt and Jeff' of multimedia platforms / Jim Hoekema
> DVI in organizational information retrieval and training / Leon A. Murphy
> Virtual reality and education / Sandra Kay Helsel
> A comprehensive approach to preparing multimedia designers: a faculty perspective / William D. Milheim
> Evaluating interactive multimedia / Thomas C. Reeves
> The future of multimedia: bridging to virtual worlds / Christopher J. Dede
> Getting started in multimedia: avoiding common pitfalls / Diane M. Gayeski

Gee, J. P. (2003). What Video Games Have to Teach Us about Learning and Literacy. New York: Palgrave Macmillan.

> Summary: A controversial look at the positive things that can be learned from video games by a well known professor of education. James Paul Gee begins his new book with "I

want to talk about video games-yes, even violent video games-and say some positive things about them." With this simple but explosive beginning, one of America's most well-respected professors of education looks seriously at the good that can come from Read more

A controversial look at the positive things that can be learned from video games by a well known professor of education. James Paul Gee begins his new book with "I want to talk about video games-yes, even violent video games-and say some positive things about them." With this simple but explosive beginning, one of America's most well-respected professors of education looks seriously at the good that can come from playing video games. Gee is interested in the cognitive development that can occur when someone is trying to escape a maze, find a hidden treasure and, even, blasting away an enemy with a high-powered rifle. Talking about his own video-gaming experience learning and using games as diverse as Lara Croft and Arcanum, Gee looks at major specific cognitive activities: How individuals develop a sense of identity; How one grasps meaning; How one evaluates and follows a command; How one picks a role model; How one perceives the world. This is a ground-breaking book that takes up a new electronic method of education and shows the positive upside it has for learning. A controversial look at the positive things that can be learned from video games.

Gee, J. P. (2004). Situated language and learning: a critique of traditional schooling. New York: Routledge.

Summary: Why do poor and minority students under-perform in school? Do computer games help or hinder learning? What can new research in psychology teach educational policy-makers? In this major new book, James Gee tackles the 'big ideas' about language, literacy and learning, applying his findings to real problems facing educationalists today. He tackles controversial debates such as the New Literacy Studies, and the idea that the academic language required to study, for example, Mathematics and the Sciences, is exclusionary and places unfair demands on poor and minority students. Gee also explores learning outside the classroom, looking at computer and video games and comparing the way a child interacts with others and technology to learn and play, with school-based learning in science classrooms. Bringing together the latest research from a number of disciplines, Language, Literacy and Learning is a bold, ambitious book by a leading figure in the field. It is essential reading for anyone interested in education and language.

Gee, J. P. (2005). Pleasure, Learning, Video Games, and Life: the projective stance. E-Learning, 2(3), 211-223. doi: http://dx.doi.org/10.2304/elea.2005.2.3.2.

Abstract: This article addresses three questions. First, what is the deep pleasure that humans take from video games? Second, what is the relationship between video games and real life? Third, what do the answers to these questions have to do with learning? Good commercial video games are deep technologies for recruiting learning as a form of profound pleasure, and have much to tell us about what learning could look like in the future should we relinquish the old grammars of traditional schooling. They are extensions of life insofar as they recruit and externalize some fundamental features of how humans orientate themselves in and to the real world when operating at their best. Video games create a projective stance in the sense of a stance toward the world in which we see the world simultaneously as a project imposed on us and as a site onto which we can actively project our desires, values and goals. A special category

of games allows players to enact the projective stance of an 'authentic professional', thereby experiencing deep expertise of the kind that so widely eludes learners in school.

Gee, J. P. (2005). What Would a State of the Art Instructional Video Game Look Like? Innovate, 1(6).

Abstract: Jim Gee believes that state of the art instructional games are already being made. Many commercial games already use good theories of learning; good learning principles are built into their designs out of necessity. Good commercial games are long, hard, and complex, and their commercial success is built on the premise that players can learn them and keep learning as they play. Gee focuses on the learning principles built into the commercially successful Full Spectrum Warrior, revealing the theory of learning behind it: a theory he refers to as "distributed authentic professionalism." Specific types of knowledge and practice are distributed between the game's characters and the player; to be successful, the player must constantly learn from the characters and use that knowledge to master the situations in the game. As Gee outlines this theory of learning, he simultaneously examines and critiques the theories of learning underlying current educational practice and establishes a model for how some types of video games might be designed with educational aims in mind.

Gee, J. P. (2005). Why video games are good for your soul. Melbourne, Australia: Common Ground Publishing.

Description: Why Video Games are Good for Your Soul is about pleasure and learning. Good video games allow people to create their own "music", to compose a symphony from their own actions, decisions, movements, and feelings. They allow people to become "pros", to feel and act like an expert soldier, city planner, world builder, thief, tough guy, wizard and a myriad of other things. They allow people to create order out of complexity, to gain and feel mastery, and to create new autobiographies, careers and histories. In his earlier book, What Video Games Have to Teach Us About Learning and Literacy, James Paul Gee offered thirty-six reasons why good video games create better learning conditions that many of today's schools. In this new book, built entirely around games and game play, he shows how good video games marry pleasure and learning and, at the same time, have the potential to empower people.

Gee, J. P. (2009). Games, learning, and 21st century survival skills. Journal of Virtual Worlds Research, 2(1). Retrieved April 28, 2009, from http://journals.tdl.org/jvwr/article/view/623/468.

Abstract: Digital games hold out great potential for human development. There is no reason to think about games simply as ―fun‖. At the same time, there is no reason to equate learning with being ―serious‖. Games and learning, at their best, engage humans at a deep level of pleasure (Gee 2005). Play and learning are primordial human urges. Unfortunately we have come to take it for granted that adulthood will kill play and schools will kill learning as a human pleasure. These assumptions are particularly dangerous in the 21st century.

Gibson, D., Aldrich, C., & Presnky, M. (2007). Games and Simulations in Online Learning: Research and Development Frameworks. Hershey, PA: Information Science Publishing.

Summary: "This book examines the potential of games and simulations in online learning, and how the future could look as developers learn to use the emerging capabilities of

the Semantic Web. It explores how the Semantic Web will impact education and how games and simulations can evolve to become robust teaching resources"--Provided by publisher.

Gibson, D., & Baek, Y. (2009). Digital Simulations for Improving Education. Hershey, PA: Information Science Reference.

   Description: Artificial instructional methods now provide the learning community with exercise specific teaching skills and learning situations that strengthen educator instincts and intuition about best practices. Digital Simulations for Improving Education: Learning Through Artificial Teaching Environments contains research and current trends used in digital simulations of teaching, surveying the uses of games and simulations in teacher education. An essential resource for teachers, educational technologists, and simulation developers, this book helps solve problems in teaching and learning through introduction of the potential and benefits of practice with digital simulations.

Gibson, D., & Grasso, S. (2008). An Enterprise Simulation Platform for Education: Building a World Game for Pre-College Students with Microsoft's ESP. Innovate, 4(6).

   Abstract: David Gibson and Susan Grasso describe the aims and theoretical foundations of the Global Challenge World Game project. The Global Challenge World Game is intended to provide pre-college students the opportunities for self-directed learning in science, technology, engineering, and mathematics. Using the Microsoft ESP visual simulation platform, the World Game will provide students with an intensive, immersive three-dimensional experience designed to help them develop understanding of the complex nature of global systems that are involved in meeting such challenges as climate change and the future of energy. The vision is to capitalize on computational science, simulation, and telecommunications tools to create powerful informal science learning opportunities. The use of a three-dimensional virtual world simulator powered by the new Microsoft ESP platform combined with innovative practices in informal e-learning will offer powerful new ways for K-12 students and teachers to learn to think in a structured fashion, work with large data sets, model complex processes, and share resources.

Gillen, J., Twinning, P. (2009). Virtual Literacy Ethnography: Investigating Literacy Practices in a Teen Second Life Project. American Educational Research Association Annual Meeting – San Diego, CA.

Gillespie, H. (2007). Learning and teaching with virtual learning environments. Exeter: Learning Matters.

   Description: Virtual Learning Environments (VLEs) are becoming increasingly common in schools, and it is important for trainees to be equipped with the necessary skills and understanding to use them effectively to enhance learning. This book takes a thematic approach, examining all the key issues from designing and creating a VLE to using one to organise, moderate and assess pupil learning and even to develop resources for learning.

Glazewski, K., Rutledge, D., Benson, J., Zeisset, M. (2009). Design for Authentic Engagement in Virtual Interactive Case-Study Environments. American Educational Research Association Annual Meeting – San Diego, CA.

Gorrell, J. (1992). Outcomes of using computer simulations. Journal of Research on Computing in Education, 24(3), 359. Retrieved from Academic Search Complete database.

Abstract: Analyzes the changes in learners' response as they sought to improve their performance using a context-specific set of computer simulations. Implications of changes in learners' response; Primary gains from learning via computer simulations.

Gouglas, S., Sinclair, S., Ellefson, O., & Sharplin, S. (2006). Neverwinter Nights in Alberta: Conceptions of Narrativity through Fantasy Role-Playing Games in a Graduate Classroom. Innovate, 2(3).

Abstract: Most humanities courses rarely require students to create the kinds of work they are studying. Sean Gouglas, Stéfan Sinclair, Olaf Ellefson, and Scott Sharplin outline the value of this rare experience by describing an assignment in their graduate humanities computing course in which students examined hypermedia narratives by authoring a Neverwinter Nights game module, a 10-minute unedited digital video, and a Web-based Flash assignment. Their first-hand experience sparked connections to narrative theory, examinations of software limitations, and the suitability of types of narrative to each formate. The range of narratives—and critical perspectives about those narratives—is, the authors feel, an indication that the assignment provided deep insights into the place of narrative in new media.

Grady, S. (2003). Virtual reality: simulating and enhancing the world with computers. New York: Facts On File.

Description: Imagine visiting friends hundreds of miles away without having to leave your own home. Visualize touring structures or monuments that have yet to be built. What if surgeons could operate on patients that were in another country? Imagine if astronauts could walk on Mars without ever having to leave Earth! With the modern advances of computer technology and virtual reality, such fantasies are becoming realities. This completely revised and updated edition of Virtual Reality explores the development of this groundbreaking scientific field and its fascinating possibilities for life at home, at work, and during leisure hours. This book provides an overview of virtual reality's history, the tools and techniques used to mimic the physical world, the fields in which virtual reality is being used, and some of the obstacles that virtual reality's supporters have had to overcome. This new edition catches up with the developments that have taken place in the past five years, including problems that virtual reality businesses have encountered as a result of the technology boom-and-bust economic cycle that took place during the last few years of the twentieth century.

Graetz, K. (November 2006). The Psychology of Learning Environments, EDUCAUSE Review, 41(6). 60-75. Retrieved April 15, 2009, from http://www.educause.edu/EDUCAUSE+Review/EDUCAUSEReviewMagazineVolume41/TheP sychologyofLearningEnviron/158100.

Graybeal, W. (1980). Simulation, principles and methods. Cambridge: Winthrop Publishers.

Gronstedt, A. (2008). Be First in Second Life. Training, Sep. 2008 Supplement, 29-30. Retrieved March 5, 2009 from EBSCOhost.

Abstract: The author discusses the application of the virtual reality software Second Life in electronic learning and training. The author mentions how Joe Miller, vice president of platform & technology development at Linden Lab conducted an online training session using the Second Life avatar. According to the author, after a few minutes in a Second Life meeting, people will see why this virtual world is heralded as the most disruptive technology of our age. It is an immersive environment that keeps participants focused and motivated on topics and tasks at hand.

Guernsey, L. (2005). Soaring Through Ancient Rome, Virtually. Chronicle of Higher Education, 51(46), A22-A24. Retrieved from Academic Search Complete database.

Abstract: The article reports that Bernard Frischer, a classics-professor turned to a computer-geek. Today he can present virtual-reality projects wherever he goes classrooms, museums, conferences, or workshops, as long as he has access to a screen and a digital projector. Frischer, who last year was appointed director of the University of Virginia, Charlottesville's Institute for Advanced Technology in the Humanities, sees the technology housed in his small black computer not only as a groundbreaking teaching tool.

Hackathorn, R. (2007). Serious Games in Virtual Worlds: The Future of Enterprise Business Intelligence. Retrieved November 24, 2007, from Business Intelligence Network Web site: http://www.b-eye-network.com/view/4163

Halverson, E. (2009). Participatory Media Spaces: Design Principles and Examples in Action. American Educational Research Association Annual Meeting – San Diego, CA.

Halverson, R. (2009). Game Design as Educational Research. American Educational Research Association Annual Meeting – San Diego, CA.

Halverson, R. (2005). What Can K-12 School Leaders Learn from Video Games and Gaming? Innovate, 1(6).

Abstract: Video games and gaming cultures have emerged as rivals for the attention of school-age children. Rather than considering whether students can learn from games, many school leaders and teachers have sought to condemn gaming and restrict the development of game-based curricula and pedagogies in schools. Richard Halverson suggests not only that valid learning theories lie beneath the entertainment veneer of video games but also that leaders could benefit from experiencing video games first hand, potentially learning about school leadership—through a carefully designed "serious" game such as those available in other fields—and awakening to the possibilities of gaming in the classroom. By doing so, such leaders would be more willing to explore how to develop curricula and establish spaces for teachers to learn and teach from gaming principles. Halverson also acknowledges the difficulties of bringing about change within the current standards-driven school environment and outlines specific ways that gaming may be incorporated into various learning environments.

Hamlen, K. (2009). Relationships between Computer and Video Game Play and Creativity among Upper Elementary School Students. *Jrnl. of Educational Computing Research*, *40*(1), 1-21.

Hammer, J., Black, J., Andrews, G., Kinzer, C., Zhou, Z. (2009). Games and Education: A Preparation for the Future Learning Approach. American Educational Research Association Annual Meeting – San Diego, CA.

Hammer, J., Black, J., Andrews, G., Kinzer, C., Zhou, Z. (2009). Games as Virtual Experience: Implications for Teaching and Design. American Educational Research Association Annual Meeting – San Diego, CA.

Harrell, C., Ghosh, B., Bowden (2004). Simulation Using ProModel (3rd ed.). Boston: McGraw-Hill. (p. 5)

Harz, C. R., & Stern, P. A. (2008). Serious Games for first responders: Improving design and usage with social learning theory (Volume A). Pepperdine University. Retrieved from ProQuest Dissertations & Theses Database.

Abstract: This dissertation examines improving the design process for creating videogame-based learning for first responders such as firefighters and soldiers involved in crisis reactions. The researchers assessed the evolution of a specific game through the lens of an aspect of social learning theory, termed Communities of Practice, in order to come up with a simple set of guidelines for a game design process that corresponds with this theory. The goal for the study was to shed light on how more and better games could be developed for first responders in the future. The problem that the research addresses is that, while the potential for such videogames for learning, termed Serious Games, appears to be very high, the actual number of effective games available for first responders is still very low. A major reason may be that past game designs have not taken learning theory into account. This is not surprising, since Serious Games are relatively new, and many game design teams have their primary design experience in creating entertainment, not learning, games. This qualitative research project utilized grounded theory methodology, with an instrument consisting of open ended in-depth interview questions. Christopher Harz focused on the point of view of the game designer community during the research, while Pamela Stern examined a game user community, specifically that of firefighters. Both sets of participants in the study--designers and users--were asked questions to determine how they functioned during the game production process, how users behaved within the game context, and how the two groups interacted with each other. The results of their interviews and investigations support the view that both designers and users function within Communities of Practice (CoPs); concomitantly, they need certain types of support to function optimally, including effective communications, the ability to collaborate, the availability of content experts, as well as authentic contextual settings and scenarios. The research results spell out how these aspects of CoPs appeared within the game context, and how the results of the interaction between the two communities--and the resulting new meta-community that formed from their interactions--influenced the process of game design and development. The researchers suggest areas of further research on technical and conceptual areas that could further improve and speed up Serious Game development, including userware, software that enables users to augment or customize the gaming environment on their own, and a Fourth Place, an environment that could

enable game user and designer communities get to know one another, exchange vital information, and merge into a meta-community with a common mission and purpose.

Hasenmyer, M. (2002). 3D Immersive Simulation in Design Education. North Carolina State University.

Summary: Final project (Master of Landscape Architecture)--North Carolina State University. Does 3D immersive simulation provide design students with a more realistic representation of space than traditional constructed models?

Hayes, E. R. (2006). Situated Learning in Virtual Worlds: The Learning Ecology of Second Life. Adult Education Research Conference (AERC) 2006 Proceedings. Retrieved March 5, 2009 from http://www.adulterc.org/Proceedings/2006/Proceedings/Hayes.pdf

Abstract: This research investigated the ―learning ecology‖ of the virtual world, Second Life. Study goals were to: (a) determine how the design and social dynamics of one virtual world support as well as constrain various types of learning, and (b) suggest implications for the use of virtual worlds in adult education.

Hayes, E., Johnson, B., Lammers, J., Lee, Y. (2009). Taking the SIMS Seriously: Play, Identity, and Girls‘ IT Learning. American Educational Research Association Annual Meeting – San Diego, CA.

Hays, R.T. (2005). The effectiveness of instructional games: A literature review and discussion. *Storming Media*, Retrieved August 21, 2009, from http://www.stormingmedia.us/53/5391/A539144.html

Hedburg, J., & Alexander, S. (1994). Virtual Reality in Education: Defining Researchable Issues. Educational Media International, 31(4), 214-20.

Abstract: Discusses situated learning and virtual reality, focusing on the pedagogical aspects of the technology and its importance in achieving a learning environment which challenges and supports effective learning.

Helsel, S. (1992). Virtual Reality and Education. Educational Technology, 32(5), 38-42.

Abstract: Intended to provide a basic understanding of virtual reality (VR) from an educational perspective, this article describes the debate between conceptual and technological orientations to VR; the conceptual orientation to VR; technological definitions of VR, artificial reality, and cyberspace; dimensions of VR; and VR's impact on education.

Hense, J., Kriz, W. C., & Wolfe, J. (2009). Putting Theory-Oriented Evaluation Into Practice: A Logic Model Approach for Evaluating SIMGAME. Simulation & Gaming, 40(1), 110-133. Retrieved from Academic Search Complete database.

Abstract: Evaluations of gaming simulations and business games as teaching devices are typically end-state driven. This emphasis fails to detect how the simulation being evaluated does

or does not bring about its desired consequences. This paper advances the use of a logic model approach, which possesses a holistic perspective that aims at including all elements associated with the situation created by a game. The use of the logic model approach is illustrated as applied to SIMGAME, a board game created for secondary school level business education in six European Union countries.

Herz, J. C., & Macedonia, M. R. (2002). Computer games and the military: two views. Fort McNair, Washington, DC: Center for Technology and National Security Policy, National Defense University. Retrieved May 4, 2009 from http://permanent.access.gpo.gov/websites/nduedu/www.ndu.edu/inss//DefHor/dh11/dh11.pdf.

Overview: Simulations are a critical aspect of U.S. military training. Commercial computer games are a growing part of our entertainment industry. The two fields have much in common, and the military can learn from the successful experience of the commercial sector. J.C. Herz provides an industry look at gaming technology and culture and suggests ways in which commercial experience can be applied to the military. Michael Macedonia responds to Herz's analysis and provides a military gamer's perspective on computer games and the military.

Hessinger, M., et. al. (2008). Hemodynamic models for education in physiology. Mathematics & Computers in Simulation, 79(4), 1039-1047. doi: 10.1016/j.matcom.2008.02.015.

Abstract: By application of case-based learning (CBL) various effects can be analyzed and demonstrated more easily. In the area of medicine one rapidly reaches boundaries in the visualization of complex information [J.L.M. Poiseuille, Recherches experimentales sur le mouvement des liquids dans les tubes de tres petits diametres, Memoires Savant des Etrangers 9 (1846) 433–544]. Learning and teaching without recourse to patients is difficult. Consequently the use of models and simulations are useful. In this paper the authors report about experiences gained with HAEMOSIM, a web-based project in medical education. The goal of this project is the design and development of interactive simulations in local hemodynamics by the application of mathematical–physiological models. These include the modeling of arterial blood flow dependent on the pressure gradient, radius and bifurcations, as well as blood flow profiles in dependency of viscosity, density and radius and finally pulse-wave dynamics with regard to local and global compliance.

Hettinger, L. J., & Haas, M. W. (2003). Virtual and adaptive environments: applications, implications, and human performance issues. Mahwah, NJ: Lawrence Erlbaum Associates.

Description: With contributions from a collection of authors consisting of many recognizable experts in the field of virtual and adaptive environments, as well as many up and coming young researchers, this book illustrates the many ways in which psychological science contributes to and benefits from the increased development and application of these nascent systems. Discussing issues from both a user- and technology-based standpoint, the volume examins the use of human perception, cognition, and behavior. The book builds a foundation on the assumption that these systems are first and foremost human-centered technologies, in that their purpose is to complement and extend human capabilities across a wide variety of domains.

Hickey, D. (2009). Designing Assessments and Assessing Designs in Educational Videogames. American Educational Research Association Annual Meeting – San Diego, CA.

Hobbs, M., Brown, E., & Gordon, M. (2006). Virtual World Environments. ITALICS, 5(3). Retrieved March 6, 2009, from http://www.ics.heacademy.ac.uk/italics/vol5iss3/originals/VWETS.html.

Abstract: This paper suggests that some of the needs for transferable skills in general, and in particular for the gaming industry, can be met by the appropriate use of gaming and virtual world environments. We hope to show that virtual worlds provide a logical progression in the use of computer mediated learning tools within a constructivist pedagogical perspective. We briefly discuss the educational properties of virtual worlds and in particular that of Second Life. We propose a project for developing group work which seeks to link affordances in the environment to learning outcomes and employs a socially-situated, constructivist pedagogical framework derived from educational learning theory.

Hoffman, D., Paek, S., Zhou, Z., Turkay, S. (2009). The Impact of Students' Domain-Specific Motivations on Educational Video Game Play. American Educational Research Association Annual Meeting – San Diego, CA.

Hoffmann, L. (2009 August). Learning Through Games. *Communications of the ACM*, *52*(8), 21-22.

Holland, W., Jenkins, H. & Squire, K. Theory by Design (2003). In Perron, B., and Wolf, M. (Eds). Video game theory reader. (pp. 25-46). London: Routledge.

Hung, W. (2008). Enhancing systems-thinking skills with modeling. British Journal of Educational Technology, 39(6), 1099-1120. doi: 10.1111/j.1467-8535.2007.00791.x.

Abstract: Systems thinking is an essential cognitive skill that enables individuals to develop an integrative understanding of a given subject at the conceptual and systemic level. Yet, systems thinking is not usually an innate skill. Helping students develop systems-thinking skills warrants attention from educators. This paper describes a study examining the effects of utilising systems modelling as a cognitive tool in enhancing a group of graduate students' systems-thinking skills. A significant improvement was observed in the systems-thinking practises of the students. A theoretical rationale for enhancing systems-thinking skills with modelling and the results of the study will be discussed.

Hung, W., Jeng, I., Omale, N., Sheu, F. (2009). Exploring the Use of Three-Dimensional (3D) Virtual Environment to Support Outside Classroom Collaboration. American Educational Research Association Annual Meeting – San Diego, CA.

Hughes, C.E. & Moshell, J. M. (1997). Shared Virtual Worlds for Education: The ExploreNet Experiment. ACM Multimedia, 5(2), 145-154. Retrieved March 5, 2008, from http://www.cs.ucf.edu/~ceh/ACMMultimedia97.doc.

Abstract: ExploreNet is an experimental environment for creating and delivering networked "virtual worlds." This system's style of user interaction was inspired by the concept of a "habitat" as first articulated in the LucasFilm's Habitat system. Players enter and interact in a habitat via their animated alter egos, called "avatars." Habitats may be created for many purposes, including social interaction, entertainment and education. Our focus has been to facilitate the creation of habitats in which virtual communities of learners and mentors interact. This paper presents details of the current ExploreNet system, including its user interface, the means it provides for creating complex behaviors, details of its implementation, the outcomes of several experiments using this system, and our plans for its natural migration to a World Wide Web-based system.

International Game Developers Association. (November 2006). Alternate Reality Games Special Interest Group, 2006 Alternate Reality Games White Paper. Retrieved April 15, 2009 from http://igda.org/arg/resources/IGDA-AlternateRealityGames-Whitepaper-2006.pdf.

Interview with Roger Smith. (2009). Training and Simulation Journal, (April/May 2009 issue). Retrieved May 4, 2009 from http://www.peostri.army.mil/CTO/FILES/2009_RSmith_TSJ_Interview.pdf.

Iuppa, N. & Borst, T. (2006). Story and simulations for serious games: tales from the trenches. Boston: Elsevier.

Description: Teaches the latest and most relevant techniques to create story-based simulations (the future of game design)!

Jacobs, G. (2009). Behind the Methodological Curtain: Theoretically Driven Decision Making in Research Across Virtual and Physical Contexts. American Educational Research Association Annual Meeting – San Diego, CA.

Jaipal, K., Figg, C. (2009). Teaching and Learning Science With Video Games: Pedagogical and Design Factors. American Educational Research Association Annual Meeting – San Diego, CA.

Jan, M., Squire, K., Mathews, J., Martin, J., Holden, C. (2009). What Happens When a Game Is a Curriculum? Lessons Learned From a Game-Based Curriculum. American Educational Research Association Annual Meeting – San Diego, CA.

Jass-Ketelhut, D. (2008). Making Learning Real: Turning Sim City Into Sim Science. ELI 2008 Online Spring Focus Session, March 18-19, 2008.

Abstract: Current theories suggest that learning is facilitated when embedded in the context in which it will be used, but the constraints of the traditional classroom make implementing this difficult to impossible. This session will focus on exploring how new technologies such as virtual environments can situate learning in a "real" virtual context, motivate students while helping them develop scientific habits of mind, and support teachers in leading complex scientific inquiries.

Jefferis, D. (1999). Cyber space: virtual reality and the World Wide Web. New York: Crabtree Pub.

Summary: Surveys digital technology from the early days of computers to virtual reality and the World Wide Web, describing the uses of computer simulation in flight, battle, hazardous environments, and entertainment.

Jeffries, P. (2007). Simulation in nursing education: from conceptualization to evaluation. New York: National League for Nursing.

Summary: Simulation in some form has probably been used as a teaching strategy in nursing education since the first nurse tried to teach the first nursing student how to do a task properly. As our understanding of teaching and learning progressed, so did the simulations that were used. This book, the first of its kind for nurse educators, is the work of an innovative, creative group of nurse educators from all types of programs who wished to share what they learned during the course of a three-year multisite project that tested simulation models and contributed to the refinement of the body of knowledge related to the use of simulation in nursing education. We hope this book provides a pathway to help nursing faculty harness and shape the learning environments of tomorrow in order to create meaningful, realistic, and evidence-based experiences for their students.

Jenkins, H., Klopfer, E., Squire, K. & Tan, P. (2003). Entering the education arcade. Computers in Entertainment 1(1), 17-17. Retrieved March 18, 2009 from http://website.education.wisc.edu/kdsquire/manuscripts/tea-acm.pdf.

Jenkins, H. & Squire, K (2004). Harnessing the power of games in education. Insight (3)1, 5-33. Retrieved March 18, 2009 from http://website.education.wisc.edu/kdsquire/manuscripts/insight.pdf

Abstract: The video game industry has been a major influence on students' lives in recent years. Now researchers consider how games might be used in pursuit of engaging, effective learning experiences. Kurt Squire and Henry Jenkins describe five detailed scenarios designed to illustrate the pedagogical potential of computer and video games. In the Leadership section, Borjana Mikic, Kara Callahan, and Domenico Grasso discuss two initiatives under way in the Picker Engineering Program at Smith College. These projects focus on the design of games and toys to enhance science and engineering education for K-16 students.

Jenkins, H. Squire, K. & Tan, P. (2003). You Can't Bring That Game To School!: Designing Supercharged! In B. Laurel (Ed.) Design research. (pp. 244-252). Cambridge, MIT Press.

Johnson, B. (2009). Virtual Economies as Financial Literacy Sandboxes: Case Studies in Second Life and Gaia Online. American Educational Research Association Annual Meeting – San Diego, CA.

Johnson, C. (2008). Drawing a Roadmap: Barriers and Challenges to Designing the Ideal Virtual World for Higher Education. EDUCAUSE Review, 43(5). Retrieved March 18, 2009 from http://connect.educause.edu/Library/EDUCAUSE+Review/DrawingaRoadmapBarriersan/47223.

Introduction: In the previous articles, the authors have provided an overview of the current status of virtual worlds in higher education, explored pedagogical and learning issues, and discussed what the future might bring. The goal of this article is to draw a roadmap for designing an —ideal" virtual world for higher education, pointing decision-makers in a general direction for implementing virtual worlds and noting various barriers along the way.

Johnson, L. F., Levine, A., & Trotta, H. (2007). The Next Generation of Digital Learning Spaces: Exploring the Frontier of Virtual Worlds. ELI 2007 Annual Meeting, January 22, 2007.

Abstract: The use of virtual worlds affords students and educators the ability to break free from the confines of traditional classrooms and online learning spaces. Pioneers of this emerging technology will discuss the creation of the New Media Consortium virtual campus as well as present case studies that will illustrate successes and challenges in this new learning frontier.

Johnson, S. H., Shelton, B., & Wiley, D. (2007). Collecting, Organizing, and Managing Resources for Teaching Educational Games the Wiki Way. Innovate, 4(2).

Abstract: Recognizing the pedagogical value of gaming, academics along with game designers and educational content developers have begun producing resources to improve educational game design and make instructional games more accessible to teachers wanting to incorporate them into their classes. However, the rapid growth of such resources has made it difficult for educators and other interested parties to find what they need. As a first step towards addressing this problem, Shelley Henson Johnson, Brett Shelton, and David Wiley discuss the creation and proposed expansion of the Teaching Educational Games Resources wiki. They first created the wiki as part of a session at the Games, Learning and Society 2006 conference. Panelists and participants contributed to the wiki before, during, and after the conference session, creating an online space that incorporates syllabi and readings for educational game design, lists hundreds of online resources, and includes links to conferences and multimedia resources. After outlining the creation of the wiki, the authors suggest that its incorporation into an online self-organizing social system could facilitate its growth and the emergence of an online community of game designers, researchers, and educators interested in educational gaming.

Jones, G., & Kalinowski, K. (2006). A Proposal for Accelerating the Implementation and Development of Video Games in Education. Innovate, 2(6).

Abstract: The integration of video games in the classroom continues to be a topic for educators and researchers alike. Yet despite the dialogue, widespread integration of this technology has yet to occur. To help remedy this situation, Greg Jones and Kevin Kalinowski propose the establishment of an online, open community designated to explore and develop learning objects related to video game technologies. They argue that an open dialogue among all of the stakeholders—researchers, developers, and educators—would better encourage the research of, endorsement for, and use of game technology in the classroom. According to Jones and Kalinowski, the proposed model has the potential to support timely development of

curricular materials, help educators align their use of games with state educational standards, establish greater collaboration between educators and game designers, and foster research for further development and integration of video games in academic settings.

Jones, G., Warren, S. (2009). The Value of Play: Tensions in the Use of Games for Learning in Classroom Settings. American Educational Research Association Annual Meeting – San Diego, CA.

Jones, Steve. (2003). Let the Games Begin: Gaming technology and college students. Report from Pew Internet and American Life Project. Retrieved April 23, 2009 from http://www.pewinternet.org/Reports/2003/Let-the-games-begin-Gaming-technology-and-college-students.aspx.

Overview: The goal of this study was to learn about college students' use of video, computer and online games, and to determine the impact of that use on their everyday life. Surveys were randomly distributed to college students at a wide range of two-year and four-year public and private colleges and universities in the continental United States. All of those surveyed reported to have played a video, computer or online game at one time or another. Seventy percent (70%) of college students reported playing video, computer or online games at least once in a while, and 65% of college students reported being regular or occasional game players. College student gamers' reported hours studying per week were similar to those reported by college students in general. Gaming is leading today's college students toward considering interaction as a routine component of entertainment.

Kafai, Y., Fields, D. (2009). The Development of Participatory Competencies in Virtual Worlds. American Educational Research Association Annual Meeting – San Diego, CA.

Kamimura, Y. (2002). The power of experience. Simulation & Gaming, 33(4), 477. Retrieved from Academic Search Complete database.

Abstract: Presents the author's reflections on her unique experience of being both creator and participant of a simulation. Part of the simulation/gaming experience considered the most important; Benefit of teachers from simulation.

Kankaa Kankaanranta, M. and Neittaanmaki, P. (2009). *Design and Use of Serious Games*. NY: Springer Science & Business.

Description: During the last few years, a new area of creative media industry, namely Serious Games, has started to emerge around the world. The term serious games has become more popular for example in the fields of education, business, welfare and safety. Despite this, there has been no single definition of serious games. A key question, what the concept itself means, has stayed unsolved though most have agreed on a definition that serious games are games or game-like interactive systems developed with game technology and design principles for a primary purpose other than pure entertainment. In this book, serious games are understood as games which aim at providing an engaging, self-reinforcing context in which to motivate and educate the players. Serious games can be of any genre, use any game technology, and be developed for any platform. They can be entertaining, but usually they teach the user something. The central aim of serious games is to raise quality of life and well-being. As part of interactive

media industry, the serious games field focuses on designing and using digital games for real-life purposes and for the everyday life of citizens in information societies. The field of serious games focuses on such areas as education, business, welfare, military, traffic, safety, travelling and tourism.

Kaufmann, H., Schmalstieg, D., & Wagner, M. (2000). Construct3D: A Virtual Reality Application for Mathematics and Geometry Education. Education and Information Technologies, 5(4), 263-276. doi: 10.1023/A:1012049406877.

Abstract: Construct3D is a three dimensional geometric construction tool based on the collaborative augmented reality system Studierstube. Our setup uses a stereoscopic head mounted display (HMD) and the Personal Interaction Panel (PIP) - a two-handed 3D interaction tool that simplifies 3D model interaction. Means of application in mathematics and geometry education at high school as well as university level are being discussed. A pilot study summarizes the strengths and possible extensions of our system. Anecdotal evidence supports our claim that the use of Construct3D is easy to learn and encourages experimentation with geometric constructions.

Ke, F. (2009). A Qualitative Meta-Analysis of Computer Games as Learning Tools. In R. Ferdig, *Handbook of Research on Effective Electronic Gaming in Education (Vol. I).* NY: IGI Global, Information Science Reference

Kebritchi, M., Hirumi, A., Bai, H. (2009). The Effects of Modern Mathematics Computer Games on Mathematics Achievement and Class Motivation: An Experimental Study. American Educational Research Association Annual Meeting – San Diego, CA.

Kelly, M. M. (2007). Immersive Learning Environments in the GeoWall. ELI Spring Focus Session, Immersive Learning Environments: New Path to Interaction and Engagement, March 27-28, 2007.

Abstract: This session will review how stereo visualization is employed nationally in undergraduate science departments to enhance student understanding. Affordable and portable GeoWall creates stereoscopic interactive virtual environments. The spatial learning advantages and promising pedagogical results will be weighed against the technical and institutional constraints.

Kelton, A.J. (Moderator). (2008). Virtual Worlds. (Chat Transcript from Second Life). EDUCAUSE 2008 Annual Conference. Retrieved March 13, 2009 from http://iggyssyllabus.pbwiki.com/Educause2008.
Abstract: Will teaching in a virtual environment really be the next big thing? A number of institutions and faculty think so, and that number is growing. This group brings together those who want to discuss how virtual learning environments impact all facets of the institution, from technology to teaching.

Kelton, A. J. (August 2007). *Second Life: Reaching Into the Virtual World for Real-World Learning*, ECAR Research Bulletin.

Abstract: Educational games and simulations can engage students in higher-level cognitive thinking, such as interpreting, analyzing, discovering, evaluating, acting, and problem solving. Recent technical advances in multiplayer, user-created virtual worlds have significantly expanded the capabilities of user interaction and development within these simulated worlds. This ability to develop and interact with your own simulated world offers many new and exciting educational possibilities. This article explores the technical capabilities and educational potential of these new worlds. Additionally, it presents and illustrates a model, which uses interaction combinations, to identify course content and topics having educational applications in virtual worlds.

Kelton, A. J. (2008). Virtual Worlds? Educause Review, 43(5), 15-22. Retrieved from Academic Search Complete database.

Abstract: The article focuses on whether virtual worlds such as "Active Worlds" and "Second Life" has a viable teaching and learning environment to the students of the present generation in the U.S. It says that the idea of synchronous interactive spaces like Chat rooms and multi-user online experiences have been on the periphery of education for decades. It notes that the 3 dimensional (3D) interactive environment "Active World" has been around since 1997 while the "Second Life" entered into the mainstream in the late 2007. Although the king of the virtual hill presently is "Second Life," it stresses that "Second Life" and its founding company Linden Lab will fade quietly into the sunset.

Kelton, A.J., Robbins-Bell, S., & Lomas, C. P. (Speakers). (2008). Virtual Worlds: Fad or Future? (MP3 File). EDUCAUSE 2008 Annual Conference. Retrieved March 13, 2009 from http://connect.educause.edu/blog/gbayne/e08podcastvirtualworldsfa/47842

Abstract: The education industry has grown weary of the "next big thing." Technology has promised much over the years, but have virtual worlds finally delivered on the promise? This session will focus on the major issues facing teaching and learning in a virtual environment.

Keskitalo, E. (2009). A Starting Point for Designing a Pedagogical Model for the Virtual Learning Environment for Health and Welfare. American Educational Research Association Annual Meeting – San Diego, CA.

Ketelhut, D., Nelson, B., Schifter, C. (2009). Situated Assessment Using Virtual Environments of Science Content and Inquiry. American Educational Research Association Annual Meeting – San Diego, CA.

Kim, J., et. al. (2001). Virtual Reality Simulations in Physics Education. Interactive Multimedia Electronic Journal of Computer-Enhanced Learning, 3(2). Retrieved March 5, 2009 from http://imej.wfu.edu/articles/2001/2/02/index.asp.

Abstract: A virtual reality physics simulation (VRPS) is an educational tool using a virtual reality interface that brings together a 3D model of real apparatus and a virtual

visualization of physical situations in an interactive manner. VRPS enhances students' understanding by providing a degree of reality unattainable in a traditional two-dimensional interface, creating a sensory-rich interactive learning environment. In this paper, we present a computer-based virtual reality simulation that helps students to learn physics concepts such as wave propagation, ray optics, relative velocity, electric machines, etc. at the level of high school or college physics.

Kim, J. Allen, J, and Lee, E. (2008, February). Alternative Reality Gaming. *Communications of the ACM*, *51*(2), 36-42.

Kim, S., Chang, M. (2009). Computer Games for Students from Different Gender and Language Groups. American Educational Research Association Annual Meeting – San Diego, CA.

King, E. (2009). Incubating Financial Literacies Through the Affordances of the Virtual Economy in World of Warcraft. American Educational Research Association Annual Meeting – San Diego, CA.

Kinnaman, D. (1997). The amazing possibilities of virtual realism. Curriculum Administrator, 32(4), 64. Retrieved from Academic Search Complete database.

> Abstract: Editorial. Discusses the role of virtual realism in education. How virtual realism serves as an excellent educational tool; Advantages of using virtual realism in education.

Kirriemuir, J. & McFarlane, A. (2004). Futurelab Series, Report 8: Literature Review in Games and Learning. Retrieved April 15, 2009 from http://www.futurelab.org.uk/resources/documents/lit_reviews/Games_Review.pdf.

> This review provides: a summary of the contemporary state of the computer and video gaming industry, market and culturean overview of the main developments in research into gaming and the educational relevance of video games, and a summary of the literature resulting from this research basis for communication between the educational research community and the commercial sector on the subject of the use of games technologies in the design of learning resources basis for discussion within educational communities on the use of digital games within educational settings.

Klabbers, J. (2006). The magic circle: principles of gaming & simulation. Rotterdam: Sense Publishers.

> Description: The purpose of this unique book is to present principles underlying the design and use of gaming and simulation. This frame-of-reference will enlighten the characteristics of particular games and simulations from a common perspective. The author pays less attention to instrumental reasoning than to methodological questions. The main reason for choosing this road is the lack of a robust methodology that underpins gaming and simulation methods. Gaming and simulation are more than methods and tools. They are firstly a way of thinking, and secondly, a method and a technique. In addition, the framework presented will help to grasp the interplay between forms of knowledge and knowledge content in connection with gaming. Interplay, which evolves through the action of the players. These notions are considered

preconditions for raising epistemological questions in relation to the educational value of games and simulations. They will provide a proper context for addressing design science and analytical science approaches to artifact assessment and theory development and testing. Due to the high diversity of approaches which the field has to accommodate the author chooses an interdisciplinary and where appropriate meta-disciplinary approach.

Klabbers, J. H. G. (2009). The Saga of ISAGAA. Simulation & Gaming, 40(1), 30-47. Retrieved from Academic Search Complete database.

Abstract: This article sketches the emergence of gaming and simulation associations in the 1960s and 1970s with a particular interest in ISAGA, the International Simulation and Gaming Association. It elaborates on the prospects to shape a meta-science of design, constituted by communities of practice and nourished by communities of observers. It is partly a transdisciplinary review on gaming and simulation methodology and partly an elaboration of current methodological questions. One reason for taking a dual position relates to the fact that members of gaming and simulation associations represent two distinct branches of science: the design and analytical sciences. The basic idea of the design sciences is to build and assess artifacts. The scientific method of the analytical sciences aims at developing and testing theories. Each pays attention to different notions of causality and different criteria for success.

Klopfer, E. and K. Squire. (2005). Environmental Detectives – The Development of an Augmented Reality Platform for Environmental Simulations. In Press for Educational Technology Research and Development. Retrieved March 18, 2009 from http://isites.harvard.edu/fs/docs/icb.topic40337.files/ETRD-handheld-_Final_.pdf.

Abstract: The mantra for bringing computers into schools has changed over the past 10 years going from ―a computer on every desktop" to a ―computer on every lap" and now to a ―computer in every child' s hand." Although some compelling examples of educational software for handhelds exist, we believe that the potential of this platform are just being discovered. This paper reviews innovative applications for mobile computing for both education and entertainment purposes, and then proposes a framework for approaching handheld applications we call ―augmented reality educational gaming." We then describe our development process in creating a development platform for augmented reality games that draws from rapid prototyping, learner-centered software, and contemporary game design methodologies. We provide an overview of our development activities spread across 5 case studies with classrooms, and provide a design narrative explaining this development process and articulate an approach to designing educational software on emerging technology platforms.

Klopfer, E. S. Yoon, and L. Rivas. (2004). Comparative Analysis of Palm and Wearable Computers for Participatory Simulations. Journal of Computer Assisted Learning 20, 347-359. Klopfer, E. and S. Yoon. (2005).

Developing Games and Simulations for Today and Tomorrow's Tech Savvy Youth. Tech Trends. 49(3) 33-41.

Knerr, B. W. (2007). Immersive simulation training for the dismounted soldier. Orlando, FL: Simulator Systems Research Unit, US Army Research Institute for the Behavioral and Social Sciences. Retrieved May 4, 2009 from http://www.hqda.army.mil/ari/pdf/SR2007-01.pdf.

Abstract: A study was conducted to document the need for immersive dismounted virtual Soldier and leader training and the available research evidence regarding the effectiveness of virtual training for training Soldiers and leaders in complex skills. A literature search of research reports, journal articles, and conference proceedings to identify evaluations and experiments related to the study topic of the training effectiveness of immersive virtual simulations was conducted. Particular attention was paid to an expended series of evaluations conducted by the Army R&D organizations during the period 1997 – 2005. The major findings are organized around the topics of training effectiveness, Soldier task performance, and advantages and disadvantages of immersive virtual simulations. Soldiers and small unit leaders report that their skills improve as a result of training in virtual simulations, and these self-reports by have generally, if informally, been confirmed by observers. While the simulators impose constraints on the performance of some Soldier activities, this should limit training effectiveness only if those activities that cannot be performed in the simulator are not trained by other means. Advantages and disadvantages of immersive simulations are also described.

Koenig, A., Atkinson, R., Harrison, C. (2009). Educational Video Game Design: Examining the Impact of Narrative and Training. American Educational Research Association Annual Meeting – San Diego, CA.

Kriggens, J. (2007). Get Serious with Virtools 4. CA: Media eBook.

Kumar, S., Chhugani, J., Kim, C., Kim, D., Nguyen, A., Dubey, Bienia, C., Kim, Y. (2008, September). Second Life and the New Generation of Virtual Worlds. *Computer*, *4*(9), 46-53.

Lainema, T. (2009). Perspective Making: Constructivism as a Meaning-Making Structure for Simulation Gaming. Simulation & Gaming, 40(1), 48-67.

Abstract: Constructivism has recently gained popularity, although it is not a completely new learning paradigm. Much of the work within e-learning, for example, uses constructivism as a reference "discipline" (explicitly or implicitly). However, some of the work done within the simulation gaming (SG) community discusses what the basic assumptions and implications of constructivism for SG are. Constructivism provides one theoretical approach to the use of computer-based systems and, as such, deserves careful consideration. The author's view is that SG researchers--as SG is a transdisciplinary field--should seek to do research that is acceptable in terms of other disciplines and need to go back to the original texts in the reference discipline to gain genuine appreciation of the arguments being proposed. This is an aim of this article. Another aim of this article is to provide theoretical tools with which to enhance SG argumentation development and debriefing.

Lainema, T., & Lainema, K. (2007). Advancing Acquisition of Business Know-How: Critical Learning Elements. Journal of Research on Technology in Education, 40(2), 183-198.

Abstract: The turbulent business environment requires business expertise from ever-larger personnel groups. The required business know-how is a combination of knowledge and several different skills, and it should provide the learners with an overall view of the functioning of a business organization as a whole. Moreover, while work is increasingly becoming a team and group effort, the potential strength of collaboration should also be presented in the learning environment. In this paper we first identify elements that advance the acquisition of relevant business know-how. Second, we describe how these elements can be embedded in a time intensive business simulation game, and present two simulation training sessions. Third, we analyze how the participants in the case trainings reflect on the elements that advance the acquisition of business knowledge. The analysis is qualitative by nature, utilizing simulation game participants' answers on questions concerning the different elements. Our results show that with dynamic simulations it is possible to support the team learning process, and enhance collaboration skills and overall understanding of the functioning of business organizations.

Lee, J. J., & Hoadley, C. M. (2007). Leveraging Identity to Make Learning Fun: Possible Selves and Experiential Learning in Massively Multiplayer Online Games (MMOGs). Innovate, 3(6).

Abstract: In this article, Joey J. Lee and Christopher M. Hoadley argue that not enough attention has been given to video games' role in identity development and exploration, important corequisites for learning. This oversight has resulted in the failure of many attempts at edutainment, in spite of the acknowledged potential of video games to engage students in meaningful learning. After discussing the potential role virtual worlds can play in adolescent identity formation and the link between identity and engagement, Lee and Hoadley offer a case study of a five-week course in which fourteen middle-school-age students participated in two massively multiplayer online games (MMOGs) as a way to explore issues of diversity and technology design. Students assumed alternate identities, changing their gender, age, or ethnicity, and used those virtual experiences as a springboard for class discussions, project work, and assignments. At the end of the course, the students, most of whom had originally described a lack of diversity in their home neighborhoods, demonstrated a new sense of empowerment and a greater sophistication in understanding other cultures and technology after their experiences with MMOGs. Notably, students expressed a high degree of engagement and motivation while learning about technology and user-centered design in the process. In light of this case study and based on other games and activities that many willingly undertake based on their own perceptions of identity, Lee and Hoadley suggest that identity may be the key to transcending the engagement/learning tradeoff in educational gaming.

Lim, K. Y. T. (2009). The six learnings of Second Life: A framework for designing curricular interventions in-world. Journal of Virtual Worlds Research, 2(1). Retrieved April 28, 2009, from https://journals.tdl.org/jvwr/article/view/424/466.

Abstract: In this paper, a framework for facilitating effective and targeted planning and design of learning environments within Second Life and other similar virtual worlds and environments will be shared. A possible scenario faced by school-leaders and teachers, with respect to thinking about incorporating virtual worlds as a complementary pedagogical strategy

alongside traditional classroom environments is first described and then the Six Learnings framework will then be elaborated upon, including its use discussed as a metric against which such learning interventions can be planned and subsequently evaluated.

Limniou, M., Papadopoulos, N., & Whitehead, C. (2009). Integration of Simulation into Pre-Laboratory Chemical Course: Computer Cluster versus WebCT. Computers & Education, 52(1), 45-52.

Abstract: Pre-laboratory activities have been known to improve students' preparation before their practical work as they assist students to make available more working memory capacity for actual learning during the laboratory. The aim of this investigation was to compare two different teaching approaches which supported a pre-laboratory session by using the same simulation program. The investigation was conducted in two countries (Greece and UK). The Greek students attended the course in a computer cluster, where the teacher and the students had a face-to-face communication, while the English students participated in the on-line WebCT course, where there was an on-line asynchronous discussion. A crucial point which emerged from this investigation was that the simulation program in the two different pre-laboratory training sessions gave the same learning outcome; however, the learning characteristics and the teacher's effort were different. Thus, the teacher could adopt both the two teaching approaches depending on the university facilities, the staff's time and the students' familiarity with virtual learning environments. However, in each case of students followed a different way (collaboration or/and independent learning) to obtain the similar learning outcome. In all cases after their pre-laboratory training session they entered the laboratory performing the experiments without any further instructions. Additionally, the teacher's role was slight difference in the two teaching approaches. In the computer cluster, the teacher had a more active role guiding students to obtain the expected learning outcome through face-to-face discussion and interaction, whereas in the case of the virtual learning environment (WebCT), the teacher had a more of a facilitator role focused on posing questions to the students and collecting the resources promoting the independent learning.

Linden Lab (2007). Second Life Officially Opens Digital World to College Students for Exploration and Study of Design and Social Communities. Retrieved November 24, 2007, from http://lindenlab.com/press/releases/04_09_20

Lindgren, R. (2009). Learning in a Virtual World Simulation Environment: A Perspective-Taking Approach. American Educational Research Association Annual Meeting – San Diego, CA.

Loftin, R.B., Engleberg, M., & Benedetti, R. (1993). Applying virtual reality in education: A prototypical virtualphysics laboratory. Virtual Reality Conference Proceedings, IEEE 1993. pp.67-74. doi: 10.1109/VRAIS.1993.378261

Abstract: A prototypical virtual physics laboratory has been constructed that allows students to control the laboratory environment as well as the physical properties of objects in that laboratory. Those environment factors that can be controlled in the current implementation include gravity (both magnitude and direction), surface friction, and atmospheric drag. The coefficients of restitution of elastic bodies can also be altered. Trajectories of objects can be

traced to facilitate measurements. The laboratory allows students to measure both displacements and elapsed time. Time may be frozen to allow for precise observation of time-varying phenomena. This laboratory will ultimately be extended into the macroscopic and microscopic domains -giving students access to direct observations that were heretofore impossible. This new application of computer graphics in education has the potential to augment or replace traditional laboratory instruction with approaches that offer superior motivation, retention, and intellectual stimulation

Long, P. D. (2007). Remote Labs. ELI Spring Focus Session, Immersive Learning Environments: New Path to Interaction and Engagement, March 27-28, 2007.

Abstract: Educating scientists and engineers in the future will demand even greater access to instrumentation. Building a collection of shared online labs brings experiments to students and lets faculty access them from the classroom. Conduct remote experiments implemented through iLabs middleware and see for yourself. If you can't come to the experiment, let the experiment come to you.

Long, P. D. (2007). Virtual Learning Environments in 3D. ELI Spring Focus Session, Immersive Learning Environments: New Path to Interaction and Engagement, March 27-28, 2007.

Abstract: We've passed through Web 1.0, entering the architecture of participation. Wikis and other read/write Web 2.0 capabilities provide a collective voice and opportunities for collaboration. They remain, however, fundamentally textual. Emerging now is the Web with shape and form--the 3D virtual world (VW). As education becomes global, will immersive 3D VWs learning spaces provide a persistent new home campus?

Maher, M. L. (1999). Designing the virtual campus as a virtual world. In Proceedings of the 1999 conference on Computer support for collaborative learning (p. 47). Palo Alto, California: International Society of the Learning Sciences. Retrieved March 5, 2009, from http://portal.acm.org/citation.cfm?id=1150240.1150287.

Abstract: Virtual Worlds are networked environments that look like the physical world, and create a sense of place for the person communicating, navigating, and doing things in the virtual world. Virtual worlds have traditionally been developed as games, in fact, most virtual worlds today are games. A virtual campus has been developed in the Architecture Faculty at the University of Sydney that is based on some of the concepts of virtual worlds. The virtual campus is a place on the internet where students can go to take courses, meet with academic staff, and communicate with other students. The development of the virtual campus has been influenced by research in design science and is based on the conceptual metaphor of architectural design. The design of the virtual campus is considered at three levels: the implementation level, the representation level, and the interface level. Identifying these levels provides a basis for the design of virtual worlds for professional and educational environments. The consideration of the representation level results in a consistent use of a conceptual metaphor so that a person in the virtual campus can make use of the facilities in an intuitive manner.

Majchrzak, D., Smith, G. (2009). Computer Games Versus Maps, Before Reading Stories: Which Primes Readers' Spatial Situation Models? American Educational Research Association Annual Meeting – San Diego, CA.

Mangina, E., & Kilbride, J. (2008). Utilizing vector space models for user modeling within e-learning environments. Computers & Education, 51(2), 493-505. doi: 10.1016/j.compedu.2007.06.008.

Abstract: User modeling has been found to enhance the effectiveness and/or usability of software systems through the representation of certain properties of a particular user. This paper presents the research and the results of the development of a user modeling system for the implementation of student models within e-learning environments, utilizing vector space models. The central challenge has been to exploit the possibilities of IUI research on user models without compromising the performance of the overall system. The research described in this paper has aimed to augment the user interface of an existing e-learning environment with relevant aspects from the domain of intelligent user interfaces, through developing a student modeling component.

Mansfield, R. (2008). How to do everything with Second life. New York: McGraw-Hill.

Description: Filled with hundreds of hands-on tutorials, tips, and techniques, this is the thorough, in-depth reference that every Second Life resident needs. Learn how to create a unique avatar and then explore, build, socialize--and even earn real money. Inside, you'll find exclusive coverage of all the menus, features, and utilities. Whether you're a newbie or an old hand, this book will help you get the most out of Second Life.

Matheis, R., et. al. (2006). Is Learning and Memory Different in a Virtual Environment? Clinical Neuropsychologist, 21(1), 146-161. doi: 10.1080/13854040601100668.

Abstract: It has been suggested that virtual reality may provide a medium for producing neuropsychological measures with greater ecological validity. The present study examined the usefulness of virtual reality (VR) to assess learning and memory in individuals with traumatic brain injury (TBI). A total of 20 TBI participants were compared with 20 healthy controls on their ability to learn and recall 16 target items presented within a VR-based generic office environment. The results indicated that VR memory testing accurately distinguished the TBI group from controls. Additionally, non-memory-impaired TBI participants acquired targets at the same rate as HC participants. Finally, there was a significant relationship between the VR Office and a standard neuropsychological measure of memory, suggesting the construct validity of the task. These findings suggest that the VR Office provides a viable medium for measuring learning and memory. The present results provide preliminary support for the ecological validity of the VR Office, which ultimately can improve assessment of real-world functioning following TBI.

Mattoon, J. S. (1994). Instructional control and part/whole-task training: a review of the literature and an experimental comparison of strategies applied to instructional simulation. Brooks Air Force Base, TX: Armstrong Laboratory, Air Force Materiel Command.

Mayer, R., Johnson, C. (2009). Limitations of Learning by Doing in an Educational Computer Game. American Educational Research Association Annual Meeting – San Diego, CA.

Mayrath, M., Traphagan, T., Trivedi, A., Resta, P. (2009). Teaching With Virtual Worlds: Factors to Consider for Instructional Use of Second Life. American Educational Research Association Annual Meeting – San Diego, CA.

McGuinness, B., & Meech, J. (1992). Human factors in virtual worlds. 1. Information structure and representation. In Using Virtual Worlds, IEE Colloquium on (pp. 3/1-3/3).

Abstract: The now-popular conception of virtual reality as a household item offering unlimited entertainment in designer fantasies is unlikely to reach the mass market for some time. The more immediate and interesting applications of VR are practical ones in the fields of science, medicine, industry and technology, in which the professional user may benefit from an enhanced experience of working in a more-or-less familiar environment. By the author's definition, VR is simply a design approach that aims to immerse the user in the sensory experiences associated with a different environment, ultimately providing an `altered sense of presence'. Technologically, VR is essentially a synthesis of advanced or novel techniques in human-computer interaction (HCI). Thus, all the established principles and methods of human factors and ergonomics in the design of human-machine systems still apply. The authors consider how VR concepts lend themselves to the much-vaunted inclusion of human factors as a driving force in systems design

McKinney, S., Horspool, A., Willers, R., Safie, O., & Richlin, L. (2008). Using Second Life with Learning-Disabled Students in Higher Education. Innovate, 5(2).

Abstract: The educational potential of Second Life is still in the process of being developed and harnessed. According to Stephanie McKinney, Agi Horspool, Renee Willers, Omar Safie, and Laurie Richlin, an essential step in this development will be to figure out how to use Second Life to support learning-disabled (LD) students who face numerous challenges in traditional instruction in higher education. The interactive and multifaceted media available in Second Life could allow educators to become less dependent on traditional methods, such as reading, lecturing, and note taking, with which many LD students struggle. Innovative pedagogical uses of Second Life would benefit these students enormously, and there are numerous opportunities to use Second Life to offer an additional channel of support for them. However, these opportunities come with their own challenges, and thus, colleges and universities need to keep the specific needs of these students in mind when developing programs that implement Second Life.

McLellan, H. (1994). Virtual reality and multiple intelligences: Potentials for higher education. Journal of Computing in Higher Education, 5(2), 33-66. doi: 10.1007/BF02948570.

Abstract: In this paper we examine how virtual reality, an emerging computer-based technology, can promote learning that engages all seven of the multiple intelligences proposed by Harvard educational psychologist Howard Gardner. We provide an overview of virtual reality technologies and an overview of Gardner's multiple intelligences. There is an extensive discussion of how virtual reality supports learning within and across seven intelligence domains.

Finally, there is a review of technical and conceptual issues concerning the implementation of virtual reality in education. Educational experiences that promote the various multiple intelligences and interlinkages are needed in the emerging electronic age more than at any previous time.

McWhorter, R., Mancuso, D., Chlup, D. (2009). Adult Learning in a Virtual Environment. American Educational Research Association Annual Meeting – San Diego, CA.

Meadows, M. (2007). I, avatar: the culture and consequences of having a second life. Indianapolis IN: New Riders.

   Description: What is an avatar? Why are there nearly a billion of them, and who is using them? Do avatars impact our real lives, or are they just video game conceits? Is an avatar an inspired rendering of its creator's inner self, or is it just one among millions of anonymous vehicles clogging the online freeways? Can we use our avatars to really connect with people, or do they just isolate us? And as we become more like our avatars do they become more like us? In I, Avatar, Mark Stephen Meadows answers some of these questions, but more importantly, he raises hundreds of others in his exploration of avatars and the fascinating possibilities they hold. His examination of avatars through the lenses of sociology, psychology, politics, history, and art, he will change the way you look at even a simple online profile and revolutionize the idea of avatars as part of our lives, whether first or second.

MediaGrid (2007). The New Media Consortium (NMC) joins Immersive Education initiative to advance virtual learning. Retrieved November 24, 2007, from the MediaGrid Web site: http://mediagrid.org/news/2007-06_nmc.html

Meglio, F. D., & Lavelle, L. (2008). The Sims: Executive Edition. BusinessWeek, (4078), 92. Retrieved from Academic Search Complete database.

   Abstract: The article reports on the use of computer simulations that allow Masters in Business Administration students to run virtual companies. The programs, used by more than half of the business schools in the U.S., can last a few days or all semester. The article describes how students and professors use the programs and what simulations are available.

Mercury News (2007). The Virtual University: San Jose State Joins Internet-based World of Second Life. Retrieved November 24, 2007, from The Mercury News Web site: http://origin.mercurynews.com/business/ci_7538063?nclick_check=1

Merriam-Webster (2007). Virtual Reality. Retrieved November 24, 2007, from http://m-w.com/dictionary/virtual%20reality

Michael, D. & Chen, S. (2006). Serious games: games that educate, train and inform. Boston MA: Thomson Course Technology.

   Description: Learn how to take the skills and knowledge you use to make games for entertainment to make serious games: games for education, training, healing, and more. "Serious Games: Games That Educate, Train, and Inform" teaches game developers how to tap into the

rapidly expanding market of serious games. Explore the numerous possibilities that serious games represent such as the ability to teach military training in a non-lethal environment and the ability to convey a particular political viewpoint through a game's storyline. You'll get a detailed overview of all of the major markets for serious games, including the military, educators, government agencies, corporations, hospitals, non-profit organizations, religious groups, and activist groups. Discover the goals of each market, the types of games on which they focus, and market-specific issues you need to consider. Case studies of how professionals in these various markets utilize games provide ideas and inspiration as well as credibility for serious games. "Serious Games" shows you how to apply your game development skills to a new and growing area and also teaches you techniques to make even entertainment-based games richer and more meaningful.

Miller, G. (2007). The Promise of Parallel Universes. Science, 317(5843), 1341-1343. Retrieved from Academic Search Complete database.

Abstract: The article reports on the significance of computer-generated realities towards research and investigations of human behavior as well as complex social interactions. The author cites the features as well as the dynamics of the computer game otherwise known as the Second Life. According to the author, Second Life allows the players to participate in virtual world wherein they can socialize in real time as well as form groups where they can forge relationships and pursue business, the arts, among other endeavors.

Miner, N., & Hofmann, J. (2009). More than a merge. T+D, 63(1), 30-33. Retrieved from Academic Search Complete database.

Abstract: The article focuses on blended learning training programs. It relates that a blended learning is a combination of learning objectives and learning modalities that are strategically combined to achieve a training program's expected learning outcomes. It mentions that the content of the blended learning could be delivered on several approaches, such as role-play session supported by lecture in a traditional classroom, a narrated PowerPoint or e-learning module, a computer simulation, a video, or a job shadowing experience.

Minh, C., Weiss, M., Herbst, P. (2009). A Pilot Study Toward Building Web-Based Interactive Rich-Media Virtual Settings for Teacher Preparation and Development. American Educational Research Association Annual Meeting – San Diego, CA.

Mitchell, R. C. (2004). Combining Cases and Computer Simulations in Strategic Management Courses. Journal of Education for Business, 79(4), 198-204. Retrieved from Academic Search Complete database.

Abstract: In this study, the author compared the effectiveness of two different strategic management course designs: one centered on case discussions and the other combining a computer-based simulation with some cases. In addition to evaluation of the research literature, the study involved experiments with six course sections composed of 130 students, Both course designs produced statistically equivalent learning outcomes; there were no significant differences between the two course designs in any of the nine outcome measures, including objective measures and student perceptions.

Moreno, R., Booker, D., Abercrombie, S. (2009). Learning From Virtual Classroom Cases in Teacher Education: The Case for Guiding Attention and Thinking in Worked-Example Instruction. American Educational Research Association Annual Meeting – San Diego, CA.

Moore, P. (1995). Learning and Teaching in Virtual Worlds: Implications of Virtual Reality for Education. Australian Journal of Educational Technology, 11(2), 91-102.

Abstract: Surveys the research into virtual reality (VR) and focuses on the implications of immersive virtual worlds for learning and teaching. Topics include how VR differs from other forms of interactive multimedia, VR and the development of educational theory and methodology, and case studies in educational VR research.

Moriya, K., Okada, M., Tarumi, H., & Yoshiura, T. (2001). Collaborative environmental education using distributed virtual environment accessible from real and virtual worlds. ACM SIGAPP Applied Computing Review, 9(1), 15-21. Retrieved March 6, 2009, from http://portal.acm.org/citation.cfm?id=570147.

Abstract: We have designed and implemented a support system for collaborative environmental education, DigitalEE, which realizes distributed virtual environment accessible from real and virtual worlds. This system introduces the following diverse features into environmental education: global arguments supported by the Internet, giving learners pseudo experiences by virtual reality, supplementing real natural experiences by augmented reality, and giving learners experts' valuable knowledge by distance education. Shared virtual space in the distributed virtual environment is "3D virtual nature", which is a VRML world representing the real nature. Learners learning through direct experiences can enter the 3D virtual nature from the real world with mobile computers, whereas experts and other participants can enter the 3D virtual nature from distant locations with their personal computers. People throughout the world can communicate with each other while sharing the same place virtually between real and virtual worlds. Learners' observation, experts' knowledge, and other participants' information are continuously accumulated in the shared 3D virtual nature as VRML objects and web pages, and the world is being updated dynamically in the learning process. With these ideas, DigitalEE realizes a new style of environmental education such as collaborative outdoor learning supported by knowledgeable experts throughout the world and interactive virtual tours to inaccessible natural environment.

MSU (2007). Michigan State University Masters in Serious Games. Retrieved November 24, 2007, from http://seriousgames.msu.edu/

Narayanasamy, V., Wong, K., Fung, C., Rai, S. (2006, April). Distinguishing Games and Simulation Games from Simulators. *ACM - Computers in Entertainment*, *4*(2).

NECC (2007). National Educational Computing Conference. Retrieved November 24, 2007, from ISTE Web site: http://center.uoregon.edu/ISTE/NECC2008/

Nelson, B., Erlandson, B. (2009). Managing Cognitive Load in Educational Multi-User Virtual Environments Through Cognitive Processing-Based Design. American Educational Research Association Annual Meeting – San Diego, CA.

Nelson, B., Ketelhut, D., Schifter, C. (2009). Situated Assessment Using Virtual Environments for Science Content and Inquiry (SAVE Science): Exploring Cognitive Load in Immersive Educational Games. American Educational Research Association Annual Meeting – San Diego, CA.

Nelson, N. (2007). Virtual reality: exploring new dimensions for conversation, language, and learning. Hagerstown, MD: Lippincott Williams & Wilkins.

> Contents:
> Virtual environments supporting learning and communication in special needs education / Sue V. G. Cobb
> An Evolution of virtual reality training designs for children with autism and fetal alcohol spectrum disorders / Dorothy C. Strickland ... [et al.]
> A Virtual approach to teaching safety skills to children with autism spectrum disorder / Trisha L. Self ... [et al.]
> Virtual reality augmentation for functional assessment and treatment of stuttering / Shelley B. Brundage
> The Potential of virtual reality to assess functional communication in aphasia / Linda J. Garcia ... [et al.]

NERCOMP (2007). Second Life Users Group: Virtual Worlds for Teaching & Learning. Retrieved November 24, 2007, from NorthEast Regional Computing Program Web site: http://www.nercomp.org/events/event_single.aspx?id=1228

Niemi, H., et. al. (2002). Theoretical understandings for learning in the virtual university (1st ed.). Hameenlinna, Finland: University of Tampere, Research Centre for Vocational Education and Training.

> Description: Advancement of learning has become a key social, political and economic objective in the global world. Knowledge creation through learning is now an important force not only in empowering individuals and groups, but also in enriching society as a whole. As knowledge production has become diffused throughout society, there have been remarkable changes in the way learning opportunities are created and accessed. No longer does any one institution or group have a monopoly on knowledge. Virtual universities are forums where knowledge is made available to a large number of students by applying the newest technology. This book raises the important question of how to empower learners in virtual university settings to become active and self-regulated learners. The focus is on theoretical understandings of learning from the viewpoint of the interaction between learners and a technological environment. The authors of the book are partners in the IQ FORM project, which is developing interactive and adaptive tools for advancing effective and meaningful learning in a virtual university. The multidisciplinary research group includes education, psychology, computing sciences, media culture, and communication and information technology. The book is a description of the initial stage of the project and introduces theoretical frameworks and solutions.

NMC (2007). New Media Consortium Campus: Seriously Engaging (video). Retrieved November 24, 2007, from http://youtube.com/watch?v=S9VZKTT6gZ8&feature=related

North Atlantic Treaty Organization (NATO). (2006). Transforming training and experimentation through modelling and simulation. Neuilly-sur-Seine Cedex, France: North Atlantic Treaty Organisation Research & Technology Organisation.

Summary: The importance of Modelling and Simulation (M&S) and the effect it has on training and experimentation in NATO and nations is the focus of the papers prepared for the NATO M&S Group (MSG) 2006 symposium (MSG-045) on "Transforming Training and Experimentation through Modelling and Simulation." Advances in low cost, high power computers, graphics and telecommunications/networking are some of the key technologies that Read more
The importance of Modelling and Simulation (M&S) and the effect it has on training and experimentation in NATO and nations is the focus of the papers prepared for the NATO M&S Group (MSG) 2006 symposium (MSG-045) on "Transforming Training and Experimentation through Modelling and Simulation." Advances in low cost, high power computers, graphics and telecommunications/networking are some of the key technologies that have provided opportunities and enabled M&S applications to become powerful tools that can assist in many ways towards the Allied Command for Transformation (ACT) mission and its commitment to the transformation of NATO's military capabilities.

Nova (2007). Virtual Reality. Retrieved November 24, 2007, from http://www.science.org.au/nova/021/021glo.htm

Nussbaum, M. (2007). Games, learning, collaboration, and cognitive divide. OECD Expert Meeting on Videogames and Education. Santiago, Chile: OECD-CERI. Retrieved May 17, 2009, from http://www.oecd.org/dataoecd/43/39/39414787.pdf.
Oblinger, D. G. (2004). The Next Generation of Educational Engagement, *Journal of Interactive Media in Education*, 8.

Abstract: Games are no longer just for fun; they offer potentially powerful learning environments. Today's students have grown up with computer games. In addition, their constant exposure to the Internet and other digital media has shaped how they receive information and how they learn. There are many attributes of games that make them pedagogically sound learning environments. An increasing number of faculty are using games as enhancements to the traditional learning environment with encouraging results. While the interactivity and engagement of games are highly positive a number of questions remain about how games will be developed, deployed and accepted in higher education.
Oblinger, D. G. (2005). Educating the Net Generation. Boulder, CO: Educause.

Summary: This book will help educators make sense of the many patterns and behaviors are seen in the Net Generation but not quite understood. Educating the Net Generation is a privilege and a challenge. They expect a great deal of us, just as we do of them. To find the right balance point, we need to understand each other well. We hope this book helps as you educate the Net Generation-and as they educate us.

Oblinger, D. G. (August 2006). Games and Learning. *EDUCAUSE Quarterly*, 29(3). Retrieved from http://www.educause.edu/EDUCAUSE+Quarterly/EDUCAUSEQuarterlyMagazineVolum/GamesandLearning/157406.

Oblinger, D. G. (2006). Learning Spaces. Boulder, CO: Educause.

   Summary: Space, whether physical or virtual, can have a significant impact on learning. Learning Spaces focuses on how learner expectations influence such spaces, the principles and activities that facilitate learning, and the role of technology from the perspective of those who create learning environments: faculty, learning technologists, librarians, and administrators. Information technology has brought unique capabilities to learning spaces, whether stimulating greater interaction through the use of collaborative tools, videoconferencing with international experts, or opening virtual worlds for exploration. This e-book represents an ongoing exploration as we bring together space, technology, and pedagogy to ensure learner success.

Oblinger, D. G. (2006). Simulations, Games, and Learning. EDUCASE Learning Initiative 2006. Abstract: Exploring games and education is inherently controversial. Even the name implies games don't involve work. However, today's games are complex, require collaboration and strenuous time commitments, and involve developing values, insights, and new knowledge. They are immersive virtual worlds often augmented by complex communities of practice. In many ways, games have become complex learning systems.

Oblinger, D., Ringle, M, & Baer, L. (2004). Unlocking the Potential of Gaming Technology. ELI 2004 Annual Meeting, January 26, 2004.

   Abstract: We will share the results of a symposium on the use of games and simulations in higher education. We will provide an overview of how games are being used in higher education as well as why they can be effective learning environments. Then, we will extrapolate what this means to different types of colleges and universities.

Ohio University (2007). Ohio University Second Life Campus (video). Retrieved November 24, 2007, from http://youtube.com/watch?v=aFuNFRie8wA

Orr, J., Calandra, B. (2009). Providing Transformational, Interpersonal Experiences for Novice Teachers Using MUVEs. American Educational Research Association Annual Meeting – San Diego, CA.

O'Shea, P., Mitchell, R., Johnston, C., Dede, C. (2009, January). Lessons Learned about Designing Augmented Realities. *International Journal of Gaming and Computer-Mediated Simulations*, 1(1), 1-15.

O'Shea, P., Mitchell, R., Johnston, S., Dede, C. (2009). Studying the Effects of a Math and Language Arts Augmented Reality. American Educational Research Association Annual Meeting – San Diego, CA.

Osawa, N. (2006). Poster3D: a system for three-dimensional authoring and presentation in immersive virtual environments. Multimedia Systems, 11(3), 216-225.

Abstract: We developed a simple system for three-dimensional (3D) authoring and presentation in immersive virtual reality environments. Our system enables a user to create and edit content both through direct manipulation using hand gestures in an immersive environment, and by using a 2D GUI on a PC desktop. The system also exploits various features of 3D information visualization to produce effective and interactive presentations. In a system trial, users found that the system enhanced their experience. The system helps users create 3D educational materials more easily and learn through the materials with greater interest and motivation.

O'Sullivan, C. and Badler, N. (Aug. 2009). Building, Populating, and Interacting with Virtual Worlds. Retrieved August 21, 2009, from http://www2.computer.org/portal/web/computingnow/archive/august2009

Otero, V. (2009). Computer Simulators as Tools for Helping Elementary Teachers Appropriate Norms and Practices of Model Building in Science. American Educational Research Association Annual Meeting – San Diego, CA.

Pannese, L., & Carlesi, M. (2007). Games and Learning Come Together to Maximise Effectiveness: The Challenge of Bridging the Gap. British Journal of Educational Technology, 38(3), 438-454.

Abstract: The authors are designing and carrying out some training sessions based on serious games with customers from different business environments and with some university student groups, both in northern Italy. Some business case studies are described in this article specifying the context, the training goal, the adopted training solution and the main characteristics of the designed game. Some screenshots are also shown. Furthermore, the authors are carrying out a survey both in the business and the university environment to analyse how the learners perceive these kinds of games in terms of effectiveness, engagement, pleasure, usability and freedom of behaviour while playing. Some results are reported in this paper, and the comparison between students' and employees' perception is shown. The questionnaire used can be found in the Appendix.

Park, S. I., Lee, G., & Kim, M. (2009). Do students benefit equally from interactive computer simulations regardless of prior knowledge levels? Computers & Education, 52(3), 649-655. doi: 10.1016/j.compedu.2008.11.014.

Abstract: The purposes of this study were to examine the effects of two types of interactive computer simulations and of prior knowledge levels on concept comprehension, cognitive load, and learning efficiency. Seventy-two 5th grade students were sampled from two elementary schools. They were divided into two groups (high and low) based on prior knowledge levels, and each group was divided into two treatment groups (a low-interactive simulation group and a high-interactive simulation group). The dependent variables were concept comprehension, cognitive load, and learning efficiency. The results showed that, for students with high prior knowledge levels, high-interactive simulations, rather than low-interactive simulations, resulted

in significantly increased comprehension scores, decreased cognitive load scores, and higher learning efficiency. On the other hand, among students with low prior knowledge levels, the low-interactive simulation group did not demonstrate significantly increased comprehension scores, but they did show lower cognitive load scores and higher learning efficiency than the high-interactive simulation group.

Parker, J. R., Becker, K., & Sawyer, B. (2008). Re-Reconsidering Research on Learning from Media: Comments on Richard E. Clark's "Point of View" Column on Serious Games. Educational Technology Magazine: The Magazine for Managers of Change in Education, 48(1), 39-43.

Abstract: Everything old is new again. In a recent "Point of View" editorial commentary in "Educational Technology," Richard E. Clark revisits the now-famous media-effects debate with a focus on serious games. Clark argues that serious games have little to offer that improves upon traditional methods. This article responds to those claims. While Clark's article makes some important points, the authors believe that Clark has based his conclusions on a somewhat one-sided subset of resources, resulting in some possible misunderstandings and invalid assumptions.

Pedro, F. (2006). The New Millenium Learners: Challenging our views on ICT and learning. Centre for Educational Research and Innovation (CERI). OECD Directorate for Education. Retrieved May 17, 2009, from http://www.oecd.org/dataoecd/1/1/38358359.pdf.

Introduction: Who exactly are the NML? Millennials is a term widely used to designate those generations born from the 1980s onwards and who have been raised in a context where digital technologies form an inextricable part of daily life. This paper is intended to synthesise available evidences on the emergence of a generational approach to learning and knowledge management strongly influenced by having always been living surrounded by and interacting continuously with information and communication technologies (ICT). The main issues addressed here are the following:

a) Who are the New Millennium Learners (NML) and how can they be characterised?
b) Are NML a general phenomenon throughout OECD countries, and what factors can explain the differences among countries as well as within each country?
c) What are the educational challenges posed by NML, and to what extent will their emergence challenge prevailing schools views about inter-personal communication, knowledge management and learning?
d) How can the NML be duly accommodated into the requirements of the knowledge society and what kind of educational responses have been successful so far? What are the education policy implications of the NML in light of the needs of the knowledge society?

Peppler, K., Warschauer, M., Diazgranados, A. (2009). Developing a Culture of Critical Game Design in a Second-Grade Classroom. American Educational Research Association Annual Meeting – San Diego, CA.

Petrovic, O., & Brand, A., (eds.) (2008). Serious games on the move. Conference Proceedings. London: Springer.
Summary: The proceedings to "Serious Games on the Move 08" will contain all results of this conference on game software applications that are designed to do more than entertain. The

focus of the contents lie on research results and developments in the rapidly moving field of serious games and their potential use in education and training as well as in the presentation of several showcases. The proceedings will address the following three topics: 1. Designing serious games: This topic will include innovations in the design of serious games, in particular games for use in education and training environments. 2. Embedding serious games and virtual worlds within learning programmes: Original research papers and case studies that investigate the potential for integration of serious games and virtual worlds within programmes of education and training will be the core content of this theme. 3. Tools, technologies and platforms: Under this topic the proceedings will provide information relating to serious games technologies.

Poe, D. F. (2007). Serious games: definition, development, and evaluation. Thesis. Oakland University. (WorldCat OCLC number: 181763931).

Additional link: http://sailaway.kl.oakland.edu/vwebv/holdingsInfo?bibId=883948

Prensky, M. (2007). Digital Game-Based Learning. St. Paul, MN: Paragon House Publishers.
        Summary: Today's workforce is quicker, sharper, more visually oriented, and more technology-savvy than ever. To truly benefit from the Digital Natives' learning power and enthusiasm, traditional training methods must adapt to the way people learn today. Written by the founder of Games2train, this innovative book is filled with examples and information to meet the demands of both educators and employers.

Psotka, J. (1995). Immersive training systems: Virtual reality and education and training. Instructional Science, 23(5-6). doi: 10.1007/BF00896880

        Abstract: This paper provides an introduction to the technology of virtual reality (VR) and its possibilies for education and training. It focuses on immersion as the key added value of VR, and analyzes what cognitive variables are connected to immersion, how it is generated in synthetic environments, what immersion is, and what its benefits are. The central research question is the value of tracked, immersive visual displays over non-immersive simulations. The paper provides a brief overview of existing VR research on training and transfer, education, and procedural, cognitive and maintenance training.

Quinn, C. N. (2005). Engaging Learning: Designing e-Learning Simulation Games (1st ed.). San Francisco, CA : Jossey-Bass

        Description: Learning is at its best when it is goal-oriented, contextual, interesting, challenging, and interactive. These same winning characteristics also define the best computer games, which suggests that the most effective learning experiences are also engaging. Learning can and should be hard fun! The challenge is to get in touch with what it takes to design learning experiences that will excite your audience. Engaging Learning offers a much-needed guide for training professionals who want to create learning programs that are both effective and engaging. Clark N. Quinn Learning, a system designer, presents a unique framework for systematically aligning the key elements of learning and engagement with a proven design process for e-learning games. This nuts-and-bolts guide, which is both research-based and grounded in experience, offers the tools needed to transform learning experiences from humdrum to fun.

Randel, J.M., Morris, B., Wetzel, C., & Whitehill, B. (1992). The effectiveness of games for educational purposes: A review of recent research. *Simulation & Gaming, 23*(3), 261.

Rankin, Y. A. (2008). Design and evaluation of Massive Multiplayer Online Role Playing Games that facilitate second language acquisition. Northwestern University. Retrieved from ProQuest Dissertations & Theses Database.

Abstract: Serious games that are designed for educational purposes promote acquisition of knowledge and skills that are valued in the both the virtual realm and the real world. The challenge is to design serious games that leverage meaningful play to produce positive learning outcomes in the real world. I argue that serious games designed for educational purposes should follow an iterative design paradigm that integrates learning objectives with specific game tasks. Furthermore, assessment of players' knowledge before and after gameplay assists serious game designers with design modifications that support learning. I argue that video games can function as unorthodox language learning tools. Applying user-centered design techniques, I determine the feasibility of Massive Multiplayer Online Role Playing Games (MMORPGs) as pedagogical tools for Second Language Acquisition (SLA). I conduct experimental studies, allowing English as Second Language (ESL) students to playtest a commercial MMORPG. Significant results from experimental studies which include assessment of ESL students' knowledge before and after gameplay reveal the importance of in-game social interactions in the target language between native speakers and non native speakers. Furthermore, in-game social interactions offer a higher degree of engagement and motivation for learning than traditional SLA pedagogy. I conclude that in-game social interactions foster emergent collaborative behaviors between ESL students and Native English speakers, and scaffold ESL students' second language vocabulary acquisition and reading comprehension skills. These results inform the design of two game modules that support second language vocabulary acquisition, reading comprehension and conversational fluency. Finally, I introduce user-centered design as a framework for repurposing commercial games as serious games that produce positive learning outcomes.

Rauch, U., Wang, T., Cohodas, M., & Mirriahi, N. (2008). Arts Metaverse. EDUCAUSE Review, 43(5). Retrieved March 18, 2009, from http://connect.educause.edu/Library/EDUCAUSE+Review/ArtsMetaverse/47243.

Raybourn, E. M. (2007). Applying simulation experience design methods to creating serious game-based adaptive training systems. Interacting with Computers, 19(2), 206-214. doi: 10.1016/j.intcom.2006.08.001.

Abstract: The purpose of the present paper is to briefly introduce adaptive training systems, and describe the Simulation Experience Design Method. Adaptive training systems are serious games whose goal it is to engender communication opportunities for players to learn about their strengths and weaknesses, receive real-time in-game performance feedback, and share diverse solutions and strategies during, between, and after game play in order to update, or adapt, player understanding. The Simulation Experience Design Method extends HCI approaches to create engaging multiplayer learning experiences by focusing on how dynamic game content, roles, scenarios, and assessment feedback contribute to emergent culture. Preliminary evaluations of an earlier instantiation of serious game-based adaptive training systems employing this design method have been positive. The contribution of the present paper lies in describing

how designers create rich systems of experiences for serious games and adaptive training systems by employing HCI principles and the Simulation Experience Design Method.

Raybourn, E. M., & Bos, N. (2005). Design and evaluation challenges of serious games. In CHI '05 extended abstracts on Human factors in computing systems (pp. 2049-2050). Portland, OR, USA: ACM. doi: 10.1145/1056808.1057094.

Abstract: As the computer game industry grows, game capabilities and designs are being re-used for purposes other than entertainment. The study of 'Serious Games', i.e. games for education and policy making, is of growing interest in many sectors. This SIG will bring together people interested in the topic area to discuss emerging opportunities and challenges. A panel discussion will cover new uses for games, ways of incorporating new measures such as physiological arousal into traditional usability testing, and ways of pursuing new goals such as peer learning with games. Breakout groups will elaborate on panel topics, and also devise next steps for this interest community. A report of this SIG's outcomes will be submitted to the SIG CHI Bulletin.

Reese, D. D. (2007). First Steps and beyond: Serious Games as Preparation for Future Learning. Journal of Educational Multimedia and Hypermedia, 16(3), 283-300.

Abstract: Electronic game technologies can prepare novice learners for future learning of complex concepts. This paper describes the underlying instructional design, learning science, cognitive science, and game theory. A structural, or syntactic mapping (structure mapping), approach to game design can produce a game world relationally isomorphic to a targeted complex concept. Such a game world should provide experiential and reflective gameplay to help learners form a preconceptual mental model of the targeted concept. A preparation for future learning (PFL) approach would follow gameplay with direct instruction.

Reeves, T., Herrington, J., & Oliver, R. (2007). Immersive learning technologies: Realism and online authentic learning. Journal of Computing in Higher Education, 19(1), 80-99. Retrieved May 10, 2009 from http://ro.uow.edu.au/cgi/viewcontent.cgi?article=1028&context=edupapers.

Abstract: The development of immersive learning technologies in the form of virtual reality and advanced computer applications has meant that realistic creations of simulated environments are now possible. Such simulations have been used to great effect in training in the military, air force, and in medical training. But how realistic do problems need to be in education for effective learning to occur? Some authors and researchers argue that problems should be real, or that simulations should have ultra-realistic physical similarity to an actual context. This paper proposes that physical verisimilitude to real situations is of less importance in learning than ‗cognitive realism', provided by immersing students in engaging and complex tasks. The paper presents a description of the theory and research that provide the foundations for this approach. Examples of courses employing cognitive, rather than physical, realism are presented together with the views of teachers, authors and instructional designers. Finally, the implications of this approach are discussed.

Reiser, R., & Gerlach, V. (1976). Research on simulation games in education a critical analysis. Arlington, VA: Air Force Office of Scientific Research.

Abstract: This paper summarizes and evaluates published research examining the use of simulation games in educational settings. Findings regarding the effects of simulation games on interest, attitudes, feeling of efficacy, knowledge, and intellectual skills are reviewed. Research shows that interest is usually aroused by the games themselves, but not necessarily by the subject matter the games represent. Findings concerning attitudes and feelings of efficacy have no apparent pattern, and student knowledge is not significantly affected by participation in a simulation game. The skill most likely to be affected by game participation is the ability to play the game. Research methods used to evaluate simulation games are reviewed and found to be less effective than they might be. Suggestions are offered for improving both simulation games and the research methods designed to evaluate them.

Reynolds, R., Caperton, I. (2009). Development of High School and Community College Students' Contemporary Learning Abilities in Globaloria. American Educational Research Association Annual Meeting – San Diego, CA.

Reynolds, R., Caperton, I. (2009). The Emergence of Six Contemporary Learning Abilities (6-CLAs) in High School Students as They Design Web-Games and Use Project-Based Social Media in Globaloria. American Educational Research Association Annual Meeting – San Diego, CA.

Rheingold, H. (1991). Virtual reality. New York: Summit Books.

Description: Imagine being able to "walk" into your computer and interact with any program you create. It sounds like science fiction, but it's science fact. Surgeons now rehearse operations on computer-generated "virtual" patients, and architects "walk through" virtual buildings while the actual structures are still in blueprints. In Virtual Reality, Howard Rheingold takes us to the front lines of this revolutionary new technology that creates computer-generated worlds complete with the sensations of touch and motion, and explores its impact on everything from entertainment to particle physics.

Richardson, D. (1995). Use of simulation in maritime operations and training. Melbourne, Australia: Aeronautical and Maritime Research Laboratory, Defence Science and Technology Organisation.

Rieber, L. P. (2005). Multimedia Learning in Games, Simulations, and Microworlds. In R. E. Mayer (Ed.), The Cambridge Handbook of Multimedia Learning (pp. 549-568). Cambridge, UK: Cambridge University Press.

Summary of Book: During the past 10 years, the field of multimedia learning has emerged as a coherent discipline with an accumulated research base that has never been synthesized and organized in a handbook. The Cambridge Handbook of Multimedia Learning constitutes the world's first handbook devoted to comprehensive coverage of research and theory in the field of multimedia learning. Multimedia learning is defined as learning from words (e.g., spoken or printed text) and pictures (e.g., illustrations, photos, maps, graphs, animation,

orvideo). The focus of this handbook is on how people learn from words and pictures in computer-based environments. Multimedia environments include online instructional presentations, interactive lessons, e-courses, simulation games, virtual reality, and computer-supported in-class presentations. The Cambridge Handbook of Multimedia Learning seeks to establish what works (i.e., to determine which features of a multimedia lesson affect learning), and to explain how it works (i.e., to explore the implications of research for practice). Book jacket.

Rieber, L. P., & Noah, D. (2008). Games, simulations, and visual metaphors in education: antagonism between enjoyment and learning. Educational Media International, 45(2), 77-92. doi: 10.1080/09523980802107096.

Abstract: The purpose of this study was to investigate the influence of game-like activities on adult learning during a computer-based simulation. This research also studied the use of visual metaphors as graphic organizers to help make the underlying science principles explicit without interfering with the interactive nature of the simulation. A total of 70 university students participated in the quantitative phase of the study. They interacted with a simple computer simulation that modelled the relationship between acceleration and velocity using a discovery-based approach. No formal instruction on the science concepts was given. Participants had control over the acceleration of a computer-animated ball. In the quantitative phase of the study, four simulation conditions were studied comprising two levels of two factors: Gaming Context (Yes, No) and Visual Metaphor (Yes, No). Results from the quantitative phase showed that although participants reported greater levels of enjoyment when the game was included, the game actually interfered with participants' explicit learning of the science principles. No effect for the visual metaphor was found. However, the use of the game in tandem with the metaphor resulted in increased levels of tacit learning, as evidenced by greater scores on a special gaming task used for evaluation at the end of the session…

Ritterfeld, U., Cody, M. J., & Vorderer, P. (2009). Serious games: mechanisms and effects. New York: Routledge.

Summary: The central purpose of this book is to examine critically the claim that playing games can provide learning that is deep, sustained and transferable to the real world.

Robbins-Bell, S. (2008). Higher Education as: VIRTUAL CONVERSATION. Educause Review, 43(5), 24-34. Retrieved from Academic Search Complete database.

Abstract: The article discusses the need for college and university instructors to improve student involvement in and outside classroom discussion through virtual conversation in the U.S. With the aid of virtual world, new opportunities are available to professors to pull learners into conversations and turn passive, knowledge-receiving students into active, knowledge-making student. It stresses that the false separation between classroom learning and life learning is falling away with each new form of social media that becomes part of every student's life. Furthermore, it says that virtual worlds like "Active World" and "Second Life" work effectively in education because it offer the most flexibility and opportunity for educational applications.

Robbins-Bell, S. (2008). Virtual Worlds as Web 2.0 Learning Spaces. ELI 2008 Annual Meeting, January 28-30, 2008.

Abstract: Virtual worlds such as Second Life offer powerful teaching and learning opportunities by integrating participatory, social, and immersive media for student-centered learning. Learn about Second Life, its use as a learning space, and its predictive role in the future of learning.

Robbins-Bell, S. (2007). Immersion and Engagement in a Virtual Classroom: Using Second Life for Higher Education. ELI Spring Focus Session, Immersive Learning Environments: New Path to Interaction and Engagement, March 27-28, 2007.
Abstract: Second Life, a multiuser virtual environment (MUVE), is the most cutting-edge virtual world available to educators today. This parlor presents a case study of one of the first university English courses held within Second Life. Participants will learn about the course and then have an exciting hands-on experience in Second Life.
Rosenbaum, E., Klopfer, E., and Perry, J. (2006). On Location Learning: Authentic Applied Science with Networked Augmented Realities. In Press for Journal of Science Education and Technology.

Roussou, M. (2004). Learning by doing and learning through play: an exploration of interactivity in virtual environments for children. Comput. Entertain., 2(1), 10-10. doi: 10.1145/973801.973818.

Abstract: The development of interactive, participatory, multisensory environments that combine the physical with the virtual comes as a natural continuation to the computer game industrys constant race for more exciting user experiences. Specialized theme parks and various other leisure and entertainment centers worldwide are embracing the interactive promise that games have made users expect. This is not a trend limited to the entertainment domain; non-formal learning environments for children are also following this path, backed up by a theoretical notion of play as a core activity in a child's development. In this article we explore a central thread in learning, play, as well as an essential characteristic of virtual reality environments: interactivity. A critical review of examples of immersive virtual reality worlds created for children, with particular attention given to the role and nature of interactivity, is attempted. Interactivity is examined in relation to learning, play, narrative, and to characteristics inherent in virtual reality, such as immersion, presence, and the creation of illusion.

Royle, K. (2008). Game-Based Learning: A Different Perspective. Innovate, 4(4).

Abstract: Because the goals of games and the object of school-based learning are fundamentally mismatched, efforts to integrate games into the curriculum have largely fallen flat despite the best intentions of teachers and the gaming industry. Arguing that educational game designers should be investigating ways to get education into games rather than getting games into education, Karl Royle describes how this might be accomplished. The discussion is contextualized by a brief outline of the shortcomings of video game usage within education. Royle demonstrates a link between the kind of learning that typically occurs in game playing and project-based learning and illustrates how curriculum-related learning material can be integrated into commercial-quality video games.

Rude-Parkins, C., Miller, K. H., Ferguson, K., & Bauer, R. (2005). Applying Gaming and Simulation Techniques to the Design of Online Instruction. Innovate, 2(2).

Abstract: Critical in virtually all educational arenas, gaming and simulation techniques and distance learning are major areas of interest in today's U.S. Army training. The U.S. Army Armor School at Ft. Knox, KY contracted with the University of Louisville and Northrop Grumman Mission Systems in 2003 to develop online training for Army Captains. They sought a program that not only incorporated gaming and simulation components but also respected the very real connectivity and software limitations of their far-flung learners. The authors discuss the development process from conception to design, providing a wide range of considerations for educators seeking to develop course-specific software.

RWJF (2007). $8.25-Million Research Program to Investigate Design Strategies and Benefits of Interactive Games to Improve Health and Health Care. Retrieved November 24, 2007, from Robert Wood Johnson Foundation Web site: http://www.rwjf.org/newsroom/newsreleasesdetail.jsp?productid=23452&typeid=160

Rymaszewski, M. (2007). Second life: the official guide. Hoboken NJ: John Wiley.

Summary: Second Life: The Official Guide is the perfect book for anyone interested in Linden Labs fascinating Second Life metaverse. This book explores in detail every aspect of Second Lifes rich and multilayered virtual world, explains how it works, and offers a wealth of information and practical advice for all Second Life residents. The first part of the book, Getting a Second Life, acquaints potential and new players with the Second Life world. It describes the metaverses geography as well as its society, explaining the written and unwritten rules. The second part, Living a Second Life, deals with the practical and economic aspects of Second Life: creating and customizing an avatar, building objects, scripting, and making money. The third part of the book, Success in Second Life, discusses ways to enjoy Second Life more. This section includes profiles of successful Second Life residents, discusses fascinating in-world events, and examines how some are using Second Life for business, training, and other purposes. The book closes with a glossary as well as quick-reference and additional-resources appendices. The accompanying CD-ROM features special animations, character templates, and textures created by Linden Lab exclusively for this book. The disc also guides new users through installation and includes a code that grants a special object their first time entering the metaverse.

Sage (2007). Simulation & Gaming: An Interdisciplinary Journal of Theory, Practice and Research. Retrieved November 24, 2007, from http://www.sagepub.com/journalsProdDesc.nav?prodId=Journal200777

Sakamoto, T. (2007). Present state of videogames and learning games: use and effects. OECD Expert Meeting on Videogames and Education. OECD-CERI. Retrieved May 16, 2009, from http://www.oecd.org/dataoecd/0/44/39530659.pdf.

Salen, K., & Zimmerman, E. (2003). Rules of Play: Game Design Fundamentals (illustrated edition.). Cambridge, MA: The MIT Press.

Description: As pop culture, games are as important as film or television--but game design has yet to develop a theoretical framework or critical vocabulary. In Rules of Play Katie Salen and Eric Zimmerman present a much-needed primer for this emerging field. They offer a unified model for looking at all kinds of games, from board games and sports to computer and video games. As active participants in game culture, the authors have written Rules of Play as a catalyst for innovation, filled with new concepts, strategies, and methodologies for creating and understanding games.. Building an aesthetics of interactive systems, Salen and Zimmerman define core concepts like "play," "design," and "interactivity." They look at games through a series of eighteen "game design schemas," or conceptual frameworks, including games as systems of emergence and information, as contexts for social play, as a storytelling medium, and as sites of cultural resistance. Written for game scholars, game developers, and interactive designers, Rules of Play is a textbook, reference book, and theoretical guide. It is the first comprehensive attempt to establish a solid theoretical framework for the emerging discipline of game design.

Salen, K., & Zimmerman, E. (2006). The game design reader: a Rules of Play anthology. Cambridge, MA: MIT Press.

Description: The Game Design Reader is a one-of-a-kind collection on game design and criticism, from classic scholarly essays to cutting-edge case studies. A companion work to Katie Salen and Eric Zimmerman's textbook Rules of Play: Game Design Fundamentals, The Game Design Reader is a classroom sourcebook, a reference for working game developers, and a great read for game fans and players. Thirty-two essays by game designers, game critics, game fans, philosophers, anthropologists, media theorists, and others consider fundamental questions: What are games and how are they designed? How do games interact with culture at large? What critical approaches can game designers take to create game stories, game spaces, game communities, and new forms of play? Salen and Zimmerman have collected seminal writings that span 50 years to offer a stunning array of perspectives. Game journalists express the rhythms of game play, sociologists tackle topics such as role-playing in vast virtual worlds, players rant and rave, and game designers describe the sweat and tears of bringing a game to market. Each text acts as a springboard for discussion, a potential class assignment, and a source of inspiration. The book is organized around fourteen topics, from The Player Experience to The Game Design Process, from Games and Narrative to Cultural Representation. Each topic, introduced with a short essay by Salen and Zimmerman, covers ideas and research fundamental to the study of games, and points to relevant texts within the Reader. Visual essays between book sections act as counterpoint to the writings. Like Rules of Play, The Game Design Reader is an intelligent and playful book. An invaluable resource for professionals and a unique introduction for those new to the field, The Game Design Reader is essential reading for anyone who takes games seriously.

Salzman, M. C., Dede, C., & Loftin, B. (1996). ScienceSpace: Virtual realities for learning complex and abstract scientific concepts. In Proceedings of IEEE Virtual Reality Annual International Symposium, (pp. 246-253). New York: IEEE Press. Retrieved April 28, 2009 from http://virtual.gmu.edu/pdf/vrais.pdf.

Abstract: Three virtual worlds have been built to investigate the effect of immersive, multisensory computer-generated experiences on learning topics in science. Currently targeted at high school and beginning college students, these worlds address Newtonian mechanics,

electrostatics, and molecular structure and dynamics. Data has been collected on usability and learning through questionnaires, pre- and post-tests, in situ prediction and experiment, and post-session interviews. The results are not uniformly conclusive but suggest that students can improve their mastery of abstract concepts through the use of virtual environments that have been designed for learning. Moreover, usability studies have identified many significant problems that have been addressed in successive refinements of these worlds. Future work will include collaborative learning studies (both local and distant), use of intelligent agents, and comparison with two-dimensional microworlds.

Salzman, M., Dede, C., Loftin, R. B., & Ash, K. (1998). VR's Frames of Reference: A visualization technique for mastering abstract information spaces. In Proceedings of the Third International Conference on Learning Sciences, pp. 249-255. Charlottesville, VA: Association for the Advancement of Computers in Education. Retrieved April 27, 2009 from http://virtual.gmu.edu/ss_pdf/icls.pdf.

Abstract: This paper describes a research study that investigated the benefits of different immersive frames of reference (egocentric, exocentric, and a combination of the two) for mastering complex and multidimensional information. Based on study outcomes, we attempt to address several questions. First, how do FORs support mastery of abstract information? Second, does the nature of the problem solving environment matter? Third, how do individual characteristics and dimensions of the learning experience influence the relationship between FORs and mastery?

Salzman, M. C., Dede, C., Loftin, B., & Chen, J. (n.d.). The design and evalution of virtual reality-based learning environments. Presence. Retrieved April 28, 2009, from http://virtual.gmu.edu/ss_pdf/presence.pdf.

Abstract: Designers and evaluators of immersive virtual reality systems have many ideas concerning how virtual reality can facilitate learning. However, we have little information concerning which of virtual reality's features provide the most leverage for enhancing understanding or how to customize those affordances for different learning environments. In part, this reflects the truly complex nature of learning. Features of a learning environment do not act in isolation; other factors such as the concept to be learned, individual characteristics, the learning experience, and the interaction experience all play a role in shaping the learning process and learning outcomes. Through Project ScienceSpace, we have been trying to identify, use, and evaluate immersive virtual reality's affordances as a means to facilitate the mastery of complex, abstract concepts. In doing so, we are beginning to understand the interplay between virtual reality's features and other important factors in shaping the learning process and learning outcomes. In this paper, we present a general model that describes how we think these factors work together and discuss some of the lessons we are learning about virtual reality's affordances in the context of this model.

Salzman, M. C., Loftin, R. B., Dede, C., & McGlynn, D. (1996). ScienceSpace: lessons for designing immersive virtual realities. In Conference companion on Human factors in computing systems: common ground (pp. 89-90). Vancouver, British Columbia, Canada: ACM. doi: 10.1145/257089.257167.

Sandford, R. (2006). Teaching with games using commercial off-the-shelf computer games in formal education. Briston: Futurelab.

Summary: "The Teaching with Games project was a one-year study designed to offer a broad overview of teachers' and students' use of and attitudes towards commercial off-the-shelf (COTS) computer games in schools. It aimed to identify the factors that would impact the use of these entertainment games in school and describe the processes by which teachers plan and implement games-based learning in existing curricular contexts. Read more
"The Teaching with Games project was a one-year study designed to offer a broad overview of teachers' and students' use of and attitudes towards commercial off-the-shelf (COTS) computer games in schools. It aimed to identify the factors that would impact the use of these entertainment games in school and describe the processes by which teachers plan and implement games-based learning in existing curricular contexts. Finally, it aimed to provide recommendations for future games-based learning approaches in schools for teachers, developers and policy makers"--P. 2.Available from http://www.futurelab.org.uk/resources/documents/project_reports/teaching_with_games/TWG_report.pdf

Sanders, R. L. (June 2007). The Genesis of a Virtual World Revisited. International Journal of Web Based Communities, 3(3), 271-282. doi: 10.1504/IJWBC.2007.014238.

Abstract: Constructing a virtual world requires certain technical skills and the ability to make difficult decisions regarding how the world will look and feel. However, the most difficult aspect of building a virtual world has less to do with the building of the virtual spaces and more to do the conceptualisation of how teaching and learning will occur in this new type of environment. This paper examines some of the issues involved in the process of planning a virtual learning world by focusing on key design questions that need to be asked prior to building virtual instructional spaces.

Sanders, W. R. (2002). Collective staff training in a virtual learning environment. Alexandria, VA: US Army Research Institute for the Behavioral and Social Sciences. Retrieved May 4, 2009 from http://www.hqda.army.mil/ari/pdf/RR1788.pdf.

Abstract: As the Army transitions to modern digital command and control technology it faces a major challenge in designing web-delivered training to support the acquisition, retention, and transfer of collective staff skills required to apply these advanced technology capabilities to real-world tasks. This report identifies training program design features based on principles of cognitive psychology that can be incorporated into Virtual Learning Environment (VLE) collective training. A prototype Cognitive Training Techniques Checklist was developed and applied in a review of U.S. Army Armor School Virtual Tactical Operational Center (VTOC) collective training. From this review candidate training program design features were identified that can support VLE training requirements. The examination of VTOC training also provided insights for Train-the-Trainer products, and a description of potential future C2 system operational capabilities and challenges. The research represents a logical extension and continuation of previous U. S. Army Research Institute for the Behavioral and Social Sciences cognitive skills training, and distance learning research conducted to assist the U.S. Army Armor

School in assessing the individual self-paced phase of training for a new Armor Captains Career Course – Distance Learning (AC3 DL) offered primarily as web-based instruction.

Sarbaum, J. K. (2007). ECON201: An Online Game for College Credit. ELI Spring Focus Session, Immersive Learning Environments: New Path to Interaction and Engagement, March 27-28, 2007.

Abstract: ECON201 is an online college course with 3D-like graphics and a complex story that teaches microeconomics through game play. Students lead a group of aliens who crash on a postapocalyptic Earth and must survive. A well-designed game is highly motivating and can employ many characteristics of effective pedagogy.

Satwicz, T., Stevens, R., McCarthy, L. (2009). Opportunities and Challenges for Understanding Learning and Game Play in Homes. American Educational Research Association Annual Meeting – San Diego, CA.

Sauvé, L., Renaud, L., Kaufman, D., & Marquis, J. S. (2007). Distinguishing between games and simulations: A systematic review. *Educational Technology & Society*, *10*(3), 247-256.

Sawyer, B., & Parker, J. (2006). Game Development Bible. Paraglyph Press.

Description: The Game Development Bible covers all of the major markets (3-d, educational games, advergaming, mobile, simulations, sports, arcade-style, and so on) and outlets for gaming. Extensive coverage is provided on the game design process, working with off-the-shelf tools and engines, the essentials of engineering games, incorporating critical elements including 3D graphics, animation, video, sound, and music, as well as mastering the business side of the industry-everything from designing to marketing to publishing your games. This book is designed to be a complete reference for the working game developer or for hobbyist developer who want to learn more about the art and practice of game development. Special attention is giving to many new emerging markets for independent and smaller developers that are the lifeblood of the industry.

Schafer, N., Kavanagh, K., Meyers, B., Swars, S., Czaplicki, K., Haardoerfer, R. (2009). Virtual Critical Friends Groups: A Vehicle for Professional Development and Supporting Beginning Teachers. American Educational Research Association Annual Meeting – San Diego, CA.

Schrader, P., Lawless, K. (2009). A Survey of WoW Players in and out of Game Multiliteracies. American Educational Research Association Annual Meeting – San Diego, CA.

Schrader, P., Lawless, K., Mccreery, M. (2009). Massively Multiplayer Online Games: Forum Discourse as an Indicator of Literacy Practices and Intellectual Exchange. American Educational Research Association Annual Meeting – San Diego, CA.

Schrader, P. G., Zheng, D., & Young, M. (2006). Teachers' Perceptions of Video Games: MMOGs and the Future of Preservice Teacher Education. Innovate, 2(3).

Abstract: Michael Young, P. G. Schrader, and Dongping Zheng use the concepts of ecological psychology to examine how massively multiplayer online games (MMOGs) promote specific learning processes in their players. In their analysis they identify and define nine principles of learning that allow such games to have valuable potential as tools for educators: the perception-action cycle, embodied cognition, social attributes of situated learning, boundary constraints on behavioral trajectories, affordance-effectivity duals, goal-directed action, contextualized learning, repetition, and detection of the raison d'être. They then provide examples of these principles in the case of two MMOGs—The Sims Online and Quest Atlantis—in order to illustrate the potential of this technology to enhance student learning in educational contexts.

Schriber, T. (1987). The Nature and Role of Simulation in the Design of Manufacturing Systems. Simulation in CIM and Artificial Intelligence Techniques, ed. Retti, J. and Wichmann, K. S.D., CA: Society for Computer Simulation. Pp. 5-8.

Schroeder, R. (1995). Learning from virtual reality applications in education. Virtual Reality, 1(1), 33-39. doi: 10.1007/BF02009711.

Abstract: This paper presents an overview of the uses of virtual reality in education. It draws particularly on three projects, the West Denton High School in Newcastle, the Human-Computer Interface Technology Laboratory's summer school in Seattle and the Shepard School for children with special needs in Nottingham. In each of these projects, there is distinctive relationship between the learning experience and the experience of virtual worlds. Here, the concern will not be with the pedagogical value of these projects, which have been documented elsewhere, but with the wider contribution that they can make to our understanding of virtual environments. To do this, it examines in each case how the virtual reality systems are integrated into the curriculum, how these systems relate to the learning process, the usability of the systems, and the possibilities and constraints of the virtual worlds. By comparing these with other emerging virtual reality applications, such as entertainment games, it can be seen that different systems present a variety of possibilities for constructing presence in, and interaction with, virtual environments.

Schroeder, R. (2002). The social life of avatars: presence and interaction in shared virtual environments. New York: Springer.

Description: Representations of humans in virtual environments are called Avatars. This volume brings together work from a variety of relevant disciplines to detail how humans interact in computer-generated environments. It contains contributions from several key people in the field, including Microsoft Research's Virtual World Group, and presents their findings in a way that is accessible to readers who are new to their field. Coverage details internet-based virtual worlds that have been widely used by the public as well as networked VR systems that have been primarily used in pilot studies and research. Some chapters take the viewpoint of a participant observer, whilst others take a more experimental approach and assess the results of relevant trials. This book will be essential reading for anyone involved in developing, using or

researching virtual worlds, and will also be of interest to students on courses such as VR and Computer-mediated communication.

Schroeder, R., Huxor, A., & Smith, A. (2001). Activeworlds: geography and social interaction in virtual reality. Futures, 33(7), 569-587. doi: 10.1016/S0016-3287(01)00002-7.

Abstract: This paper examines the interrelation between the geographical and social aspects of virtual worlds. We examine the main geographical features of Activeworlds, a multi-user virtual environment available over the Internet. Activeworlds is not only one of the most popular virtual environments, it is also the only publicly accessible one in which users can build themselves, and thus shape their geographical and social environment. We examine, among other features, transportation, mobility, and property appropriation in this virtual worlds system. Further, we describe some of the influences, both from urban planning and science fiction, on the geography of Activeworlds. We also examine the social relations that arise from these geographical conditions, including the _rough and ready' mentality of this _cyberspace frontier'. Finally, we consider the implications of this virtual worlds system for theories of the emerging geographical and social relations in virtual environments.

SDSU (2007). EDGames. Retrieved November 24, 2007, from San Diego State University Web site: http://edweb.sdsu.edu/courses/EDTEC670/

Second Life Education Workshop 2007. Part of the Second Life Community Convention. Chicago Hilton, August 24 to 26, 2007. Retrived March 5, 2009 from http://mediax.stanford.edu/seminars/slccedu07proceedings.pdf.

Seidel, R., Chatelier, P., & NATO Defense Research Group. (1997). Virtual reality, training's future?: perspectives on virtual reality and related emerging technologies. New York: Plenum Press.

Seidman, R. (2009a). Alice via Interactive Game Programming. *The 2009 Duke University Alice Symposium – June 17, 2009.*

Seidman, R. (2009b). Alice First: 3D Interactive Game Programming. *Proceedings of the 2009 ACM-SIGCSE Annual Conference on Innovation & Technology in Computer Science Education.* Paris: Universite Pierre et Marie Curie.

Serious Games Source (2007). 2007 Serious Games Summit GDC. Retrieved November 24, 2007, from http://seriousgamessource.com/features/feature_040307_sgsgdc_1.php

Shaffer, D. W. (2005). Epistemic Games. Innovate, 1(6).

Abstract: David Williamson Shaffer describes the concept of "epistemic games" as a way to help students learn to think like professionals. This concept is based on the idea of "epistemic frames"—the way of thinking and working of a profession or other community of practice—and entails a situated and action-based form of learning based on the ways in which professionals develop these epistemic frames. He provides an example of a game prototype (Madison 2200) that demonstrates how the simulation of professional training is both an engaging (and

enjoyable) activity and a compelling learning experience. He argues that this approach makes it possible to create epistemic games in which people learn to work as doctors, lawyers, architects, engineers, journalists, and other valued professionals, and thus develop skills, habits, and understandings of a post-industrial society.

Shaffer, D. W. (2007). Epistemic games to improve professional skills and values. OECD Expert Meeting on Videogames and Education. Santiago, Chile: OECD-CERI. Retrieved May 17, 2009, from http://www.oecd.org/dataoecd/0/21/39530780.pdf.

Shaffer, D. (2006). How computer games help children learn (1st ed.). New York: Palgrave Macmillan.

Description: How can we make sure that our kids are learning to be creative thinkers in a world of global competition--and what does that mean for the future of education in the digital age? David Williamson Shaffer offers a fresh and powerful perspective on computer games and learning. How Computer Games Help Children Learn shows how video and computer games can help teach kids to build successful futures--but only if we think in new ways about education itself. Shaffer shows how computer and video games can help students learn to think like engineers, urban planners, journalists, lawyers, and other innovative professionals, giving them the tools they need to survive in a changing world. Based on more than a decade of research in technology, game science, and education, How Computer Games Help Children Learn revolutionizes the ongoing debate about the pros and cons of digital learning.

Shaffer, D. W., et. al. (October 2005). Videogames and the Future of Learning. *Phi Delta Kappan*, 87(2). 104-111. Retrieved April 15, 2009 from http://ddis.wceruw.org/docs/08%20ShafferSquireHalversonGee%20PDK.pdf.
Abstract: Most educators are dismissive of video games. But corporations, the government, and the military have already recognized and harnessed their tremendous educative power. Schools have to catch up, the authors argue.

Sheehy, P. (2009). Give Your Professional Development a Second Life. Technology & Learning, 29(7), 28-30. Retrieved from Academic Search Complete database.

Abstract: The article offers some insights into career development opportunities and educators' benefits related to using Second Life virtual reality, citing the author's experiences as teacher in education in virtual reality in the U.S. Through Second Life, the author was able to open the first middle school in Teen Second Life where she and other educators were able to discuss every curriculum area, extending concepts, exploring ideas and demonstrating knowledge. Key benefits and implications of Second Life technology on education are cited. INSET: Second Life Resources.

Shelton, B., & Wiley, D. (2007). The design and use of simulation computer games in education. Rotterdam: Sense Publishers.

Description: This volume presents a collection of empirical and theoretical work relating to simulation computer games, exploring the interrelationships between the instructional design and the educational use of these materials. The authors explore the interrelationships between design and use--success in both are critical to achieve the desired ends of facilitating learning--

and provide a scholarly treatment of a topics frequently handled in an anecdotal, "pop science" manner. While there is a broad literature in the design of instructional materials and in the implementation or use of those materials, the design and use of educational simulation computer games is significantly different. The overwhelming majority of traditional instructional materials are designed to be used primarily as a teacher guides a learner. However, the vast majority of computer simulation games are designed to be used directly by the learner, without much mediation. A better understanding of these issues is critical for effective game-based learning. Chapters range from different approaches to design and different subject matter to the different types of technology-based environments. This book does not provide a "complete" perspective of any depth within cognitive science and computer science technology, nor does it "unmask the myth" of computer simulation games in education, as other volumes claim to do. Instead, this book provides a breadth of perspectives that move from "what we think" to "what we know" about simulation computer games in education, and gives an up-to-the-moment picture of "where we're at" in the theory, design and use of simulation computer games.

Sherlock, L. (2008). "Gaming" genre: Serious games, genre theory, and rhetorical action. Michigan State University. Retrieved from ProQuest Dissertations & Theses Database.

Abstract: Despite recent increases in digital gaming research from rhetoric/composition scholars, there have been relatively few scholarly treatments of serious games as sites of rhetorical action and critique. In response to this gap, I argue for the need for rhetoric/composition scholars to start "paying attention" to serious games. The disciplinary frameworks of rhetorical studies, literacy studies, and communication are employed to survey the current literature on serious gaming and identify points of synthesis. I then introduce a more focused idea drawn from rhetorical studies, genre theory, to examine the question of why scholars in rhetoric/composition should pay attention to and focus their work on serious games. I conclude by discussing implications of the relationship between serious games and genre in various contexts, including implications for first-year composition pedagogies, digital rhetoric and new media pedagogies, and potential research projects and questions to be taken up by rhetoric/composition as a field.

Shernoff, D., Coller, B. (2009). Finding Flow in a Video Game Approach to Mechanical Engineering Instruction: A Study of Student Engagement. American Educational Research Association Annual Meeting – San Diego, CA.

Sibuma, B. (2009). Virtual Characters: Event-Related Potentials Show Differences in Cognitive Processing Due to Visual Realism. American Educational Research Association Annual Meeting – San Diego, CA.

SIGGRAPH (2007). The 35th International Conference and Exhibition on Computer Graphics and Interactive Techniques. Retrieved November 24, 2007, from ACM Special Interest Group on Graphics Web site: http://www.siggraph.org/s2008/

Sims (2007). The Sims 2. Retrieved November 24, 2007, from The Sims 2 Web site: http://thesims2.ea.com/about/index.php?pid=pcgames

Simkins, D. (2009). Negotiating a Virtual Economy. American Educational Research Association Annual Meeting – San Diego, CA.

SimTeach (2007a) Information and Community for Teachers in Multi-User Virtual Environments. Retrieved November 24, 2007, from SimTeach Web site: http://www.simteach.com/wiki/index.php?title=Main_Page

SimTeach (2007b). Second Life: Universities and Private Islands. Retrieved November 24, 2007, from SimTeach Web site: http://www.simteach.com/wiki/index.php?title=Second_Life:_Universities_and_Private_Islands #Edinburgh_University_.28aka_The_University_of_Edinburgh.29

SimTeach (2007c). Second Life Education Wiki. Retrieved November 24, 2007, from SimTeach Web site: http://www.simteach.com/wiki/index.php?title=Second_Life_Education_Wiki#Academic_Research

Singer, M. J., Kring, J. P., & Hamilton, R. M. (2006). Instructional features for training in virtual environments. Orlando, FL: Simulator Systems Research Unit, US Army Research Institute for the Behavioral and Social Sciences. Retrieved May 4, 2009 from http://www.hqda.army.mil/ari/pdf/TR1184.pdf.

Abstract: The U.S. Army is committed to using interactive simulations to provide training for Soldiers. Virtual Environment (VE) and gaming technology may allow the U.S. Army to cost-effectively conduct planning, training, and rehearsal activities for both individual and collective dismounted Soldier tasks. The simulation technology also supports or provides stimuli that could enhance learning through instructional strategies, tactics, and instructional features. Research on effects of specific VE system characteristics and instructional applications must be performed to establish the benefits, problems, and guidelines for training and rehearsing complex activities and tasks using VE technology. This experiment investigated the training effect of instructional interventions in VE for training representative Soldier tasks. The research addressed Interrogative Coaching and an Attention-Direction Instructional Feature on initial skill acquisition of dismounted Soldier tasks incorporating basic recognition and decision skills. The results indicate that there is no initial learning advantage to the type of Attention Direction feature that was used, and that the Interrogative Coaching did seem to aid the skill acquisition of the more complex Bounding Overwatch task. The results are also being used to shape continued investigations into the use of instructional strategies, tactics, and features in VE simulations for dismounted Soldier tasks.

SJSU (2007). SLIS Second Life Campus Video (video). Retrieved November 24, 2007, from http://youtube.com/watch?v=b72CvvMuD6Q

Skiba, D. J. (2007). Nursing Education 2.0: Second Life. Nursing Education Perspectives, 28(3), 156-157. Retrieved from Academic Search Complete database.

Abstract: The article discusses the significance of various online nursing education in the U.S. Internet and Web 2.0 technologies can create simulated experiences that are helpful to

nursing. One example is the web site, Second Life, wherein a three-dimensional virtual world is built and owned entirely by its residents, the end users. There are also other great examples of the use of virtual worlds in health care education. These would include the Dartmouth College's Synthetic Environments for Emergency Response Stimulation, the multiuser immersive environment by the Institute of Rural Health Idaho State University, the cyber community of the Centers for Disease Control and the virtual relay for raising money by the American Cancer Society.

Skurzynski, G. (1991). Almost the real thing: simulation in your high-tech world (1st ed.). New York: Bradbury Press.

Summary: An introduction to physical and computer simulations, focusing on the use of wind tunnels, air and automotive safety testing, astronaut training, and current and future uses of images created by computer simulation.

SL (2007). Second Life. Retrieved November 24, 2007, from Second Life Web site: http://secondlife.com

Slator, B. M., et. al. (1999). Virtual Environments for Education. Journal of Network and Computer Applications, 22(3). 161-174. doi:10.1006/jnca.1999.0089

Abstract: WWWIC, the NDSU World Wide Web Instructional Committee, is engaged in developing a range of virtual environments for education. These projects span a range of disciplines, from earth science to anthropology, and from business to biology. However, all of these projects share a strategy, a set of assumptions, an approach to assessment, and an emerging tool set, which allows each to leverage from the insights and advances of the others.

Smith, R. (2009). The long history of gaming in military training. Simulation and Gaming (April 2009 issue).

Abstract: The dual-use of games in both military and entertainment applications has a long history. This has taken the form of sand tables, miniatures, board games, and computer games. The current tension between entertainment and military applications over games is just the return of similar concerns that have surrounded gaming tools and technologies in previous generations. Dynamic representations of the physical world are interesting and useful tools in a number of fields, to include the military, city planning, architecture, education, and entertainment. Modern computer games contain technologies and tools that allow many different communities to accomplish similar goals.

Snir, J., Grosslight, L., & Smith, C. (1988). The truth, but not the whole truth: an essay on building a conceptually enhanced computer simulation for science teaching: draft article. Cambridge, MA: Educational Technology Center, Harvard Graduate School of Education.

Society for Computer Simulation. (1992). Simulation in education for business, management, and MIS and, Simulation languages and software tools: proceedings of the 1992 Western Simulation Multiconference, 20-22 January, 1992, Newport. San Diego, CA: Society for Computer Simulation.

Sontag, M. (2009). A Learning Theory for 21st-Century Students. Innovate, 5(4).

Abstract: The affordances of today's digital technologies have significantly changed the way students learn. Arguing that current learning theories have failed to address this new reality, Marie Sontag proposes a new theory, social-connectedness and cognitive-connectedness schemata (SCCS) theory, that integrates key elements of other theories with gaming elements in a structure designed to facilitate engagement of students' social- and cognitive-connectedness schemata. The results of a pilot study using an instructional design model based on SCCS theory showed that students learning in an environment shaped according to these principles developed higher levels of expertise and greater learning transfer.

Sosnoski, J., Harkin, P., & Carter, B. (2006). Configuring history: teaching the Harlem renaissance through virtual reality cityscapes. New York: Peter Lang Publishing.

Summary: The multidisciplinary essays in Configuring History describe how teachers can use virtual reality technology to teach the Harlem Renaissance. Describing in detail the construction of Virtual Harlem, Bronzeville, and Montmartre—all important sites in African American cultural history—the essays delineate the technologies employed in the construction of these cityscapes and the learning theory—configuring history—that informs the project. The book provides a model of a collaborative learning network, linking classrooms at universities in the United States and in Europe, and demonstrates the importance of collaboration between the sciences and the humanities for the future development of instructional technologies. Contributors include: Holly Davenport, Tom DeFanti, Brenda Eatman Aghahowa, Liliane Gallet-Blanchard, Andrew Johnson, Steve Jones, Jason Leigh, Janice Lively, Marie-Madeleine Martinet, Ken McAllister, Kyoung Park, William Plummer, Timothy Portlock, Jim Pyfer, David Richardson, Georgia Tappan, Veronica Watson, Chris White, Trent White

Sotamaa, O. (2007). Perceptions of player in game design. OECD Expert Meeting on Videogames and Education. OECD-CERI. Retrieved May 17, 2009, from http://www.oecd.org/dataoecd/44/19/39414857.pdf.
Abstract: The objective of this short paper is to provide some clarity on the issue of player-centred design by analysing the notions on player in current game design literature. The paper presents a grouping of different designer-player relationships that reflect different design ideologies and traditions. This study also discusses the potentials a multifaceted approach on players can offer for the design of games.

Spiegelman, M. and Glass, R. (2009) Games and Web 2.0: A Winning Combination for Millennials. *Jrnl. of Educational Technology Systems*. *37*(3), 273-289.

Squire, K.D. (2005). Changing the Game: What Happens When Video Games Enter the Classroom?. Innovate 1(6). Retrieved March 18, 2009 from http://www.innovateonline.info/index.php?view=article&id=82.

Abstract: Kurt Squire criticizes the current organization of schools based on his experiences using *Civilization III* in a high school history classroom. Squire's case study reveals that *Civilization III* appeals particularly to those students for whom a traditional education is

simply not working. Students who do well in the classroom, however, are more reluctant to view gaming as a legitimate learning tool and experience much more frustration when playing the game. Squire looks to the hierarchical organization of the classroom as the reason behind this perhaps suprising result. He outlines the benefits of and obstacles to widespread game implementation, pointing out the failures of the traditional secondary curriculum and detailing improvements that would organize school culture around learning rather than social control.

Squire, K. (2009). CivWorld: Trajectories of Expertise and Competitive Play in a Game-Based Learning Environment. American Educational Research Association Annual Meeting – San Diego, CA.

Squire, K. (2009). Designing Educational Systems for a Participatory Media Age. American Educational Research Association Annual Meeting – San Diego, CA.

Squire, K. D. (2007). Games, Learning, and Society: Building a Field. Educational Technology Magazine: The Magazine for Managers of Change in Education, 47(5), 51-55.

Abstract: Computer and video games have recently attracted significant attention from educators as a medium for learning. Clark's (2007) critique of the "Serious Games" movement provides a set of useful guidelines for moving that particular industry forward. This article argues for another way of framing the emerging field, as "Games, Learning, and Society." Research and theory in this field can be conceptualized in three overlapping areas: researching learning in popular gaming cultures, designing learning environments based on those principles, and reconceptualizing educational practice for an interactive age.

Squire, K.D. (2005). Game-based learning: The present and future of state of the field. Saratoga Springs, NY: MASIE Center e-Learning CONSORTIUM, 2005.

Summary: "The purpose of this research paper is to document and describe the contemporary games and learning movement. It seeks to provide a strategic framework and underlying argument for understanding the impact of games on business and training"--Pg. 9.

Squire, K. (2009). Place-Based Games and Mobile Learning. American Educational Research Association Annual Meeting – San Diego, CA.

Squire, K.D. (2005). Recessitating educational technology research: design based research as a new research paradigm. Educational Technology 45(1), 8-14.

Squire, K.D. (2002). Rethinking the role of games in Education. Game Studies, 2(1). Retrieved March 18, 2009 from http://www.gamestudies.org/0102/squire/.

Squire, K.D. (2004). Sid Meier's Civilization III. Simulations and Gaming, 35(1): 135-140.

Squire, K. (2006). From Content to Context: Videogames as Designed Experience. Educational Researcher, 35(8), 19-29. doi: 10.3102/0013189X035008019.

Abstract: Interactive immersive entertainment, or videogame playing, has emerged as a major entertainment and educational medium. As research and development initiatives proliferate, educational researchers might benefit by developing more grounded theories about them. This article argues for framing game play as a designed experience. Players' understandings are developed through cycles of performance within the gameworlds, which instantiate particular theories of the world (ideological worlds). Players develop new identities both through game play and through the gaming communities in which these identities are enacted. Thus research that examines game-based learning needs to account for both kinds of interactions within the game-world and in broader social contexts. Examples from curriculum developed for Civilization III and Supercharged! show how games can communicate powerful ideas and open new identity trajectories for learners.

Squire, K. D. (2008). Video Game-Based Learning: An Emerging Paradigm for Instruction. Performance Improvement Quarterly, 21(2), 7-36.

Abstract: Interactive digital media, or video games, are a powerful new medium. They offer immersive experiences in which players solve problems. Players learn more than just facts--ways of seeing and understanding problems so that they "become" different kinds of people. "Serious games" coming from business strategy, advergaming, and entertainment gaming embody these features and point to a future paradigm for eLearning. Building on interviews with leading designers of serious games, this article presents case studies of three organizations building serious games, coming from different perspectives but arriving at similar conclusions. This article argues that such games challenge us to rethink the role of information, tools, and aesthetics in a digital age.

Squire, K. (2003). Video games in education. International Journal of Intelligent Simulations and Gaming (2) 1.

Abstract: Computer and video games are a maturing medium and industry and have caught the attention of scholars across a variety of disciplines. By and large, computer and video games have been ignored by educators. When educators have discussed games, they have focused on the social consequences of game play, ignoring important educational potentials of gaming. This paper examines the history of games in educational research, and argues that the cognitive potential of games have been largely ignored by educators. Contemporary developments in gaming, particularly interactive stories, digital authoring tools, and collaborative worlds, suggest powerful new opportunities for educational media.

Squire, K., Barnett, M., Grant, J. M., & Higginbotham, T. (2004). Electromagnetism supercharged!: learning physics with digital simulation games. In Proceedings of the 6th international conference on Learning sciences (pp. 513-520). Santa Monica, California: International Society of the Learning Sciences.

Abstract: Learning scientists are increasingly turning to computer and video games as tools for learning. Simulation might not only motivate learners, but provide accessible ways for students to develop intuitive understandings of abstract physics phenomena. This study examines what learning occurs when an electromagnetism simulation game is used in a school for underserved students. Students in the experimental group performed better than students in the

control group (guided discovery-based science) on measures for understanding. Game mechanics enabled students to confront weaknesses in understandings, and physics representations became tools for understanding problems. Implications for the design of educational digital media are discussed. Yet, it was also these very same game mechanics posed significant challenges in terms of student engagement, motivation, and learning of physics concepts.

Squire, K., Giovanetto, L., Devane, B., & Durga, S. (2005). From Users to Designers: Building a Self-Organizing Game-Based Learning Environment. TechTrends: Linking Research & Practice to Improve Learning, 49(5), 34-43.

Abstract: The simultaneous publication of Steven Johnson's Everything Bad is Good for You and appearance of media reports of X-rated content in the popular game Grand Theft Auto has renewed controversies surrounding the social effects of computer and video games. On the one hand, videogames scholars argue that videogames are complex, cognitively challenging and emotionally engaging--possibly the most compelling of contemporary popular art forms. Game scholars note how games are transforming government, industry and perhaps now education. Meanwhile, critics claim that games have little redeeming social value and may even be harmful. Even those sympathetic to new technologies are concerned that game players do not understand how games work as simulations. Sherry Turkic wonders if kids playing Sin City are primarily learning simplistic rules such as "raising taxes always leads to riots." To date, relatively little is known about the consequences of game play on the cognition of those who play them, and there are very few studies of "expert" game practice. Questions of how games operate have important implications for the design of interactive learning systems. If a "serious games" market is going to mature, the will be a need for better theoretical models of how games function to produce learning, what kinds of understandings players take away from their games and how these understandings are (and aren't) taken up elsewhere. This design-based research study attempts to answer some of these questions by developing and investigating an after-school program for playing the computer game Civilization III. It offers a model for the design of after-school game-based learning environments and explores the cognitive and affective impact of participation in a gaming community.

Squire, K. & Jenkins, H. (2003). Harnessing the Power of Games in Education. Insight, 3, 7-33. Retrieved March 5, 2009 from http://www.edvantia.org/products/pdf/InSight_3-1_Vision.pdf

Abstract: The video game industry has been a major influence on students' lives in recent years. Now researchers consider how games might be used in pursuit of engaging, effective learning experiences. Kurt Squire and Henry Jenkins describe five detailed scenarios designed to illustrate the pedagogical potential of computer and video games. In the Leadership section, Borjana Mikic, Kara Callahan, and Domenico Grasso discuss two initiatives under way in the Picker Engineering Program at Smith College. These projects focus on the design of games and toys to enhance science and engineering education for K-16 students.

Squire, K.D. & Steinkuhler, C.A. (2005). Meet the gamers: Games as sites for new information literacies. Library Journal. Retrieved March 18, 2009 from http://www.libraryjournal.com/article/CA516033.html.

Steinkuehler, C. (2007). Cognition, Learning, and Literacy in Virtual Worlds. ELI Spring Focus Session, Immersive Learning Environments: New Path to Interaction and Engagement, March 27-28, 2007.

Abstract: This presentation will detail the intellectual practices that constitute gameplay in virtual worlds (for example, collaborative problem solving, informal scientific reasoning, computational literacy, and digital media literacy) and the way these coalesce into a form of cosmopolitanism found in the least likely of places, in context of pop culture.

Steinkuehler, C. (2009). A Topology of Literacy Practices in Virtual Worlds. American Educational Research Association Annual Meeting – San Diego, CA.

Steinkuehler, C. and Johnson, B. (2009, January). Computational literacy in online games: The social life of mods. *International Journal of Gaming and Computer-Mediated Simulations*, 1(1), 53-65.

Steinkuehler, C., Duncan, S., King, E., Simkins, D., Fahser-Herro, D., Alagoz, E. (2009). Mixed Methods Research In Virtual Worlds. American Educational Research Association Annual Meeting – San Diego, CA.

Steinkuehler, C., King, E., Fahser-Herro, D., Simkins, D., Alagoz, A. (2009). Digital Literacies for the Disengaged: Creating After-School Online Game-Based Learning Environments for he Boys. American Educational Research Association Annual Meeting – San Diego, CA.

Stoup, P. (2008). The development and failure of social norms in Second Life. Duke Law Journal. , 58, 2. p.311(34). Retrieved March 01, 2009, from Expanded Academic ASAP via Gale:
http://find.galegroup.com/itx/infomark.do?&contentSet=IAC-Documents&type=retrieve&tabID=T002&prodId=EAIM&docId=A189957888&source=gale&userGroupName=nhc_main&version=1.0

Abstract: This Note analyzes the development and efficacy of social norms in maximizing the welfare of participants in the virtual community of Second Life. Although some of these norms developed appropriately in response to the objectives and purposes of this virtual world, Second Life is so thoroughly steeped in conditions that have impeded the development of successful social norms in other communities that any system of social norms in Second Life will ultimately fail. Because social norms will likely fail to successfully maximize resident welfare, regulatory schemes imposed both by the operators of the virtual world and by real-world governing institutions are needed to enhance the functioning of this particular alternative reality inhabited by millions.

Susi, T., Johannesson, M., & Backlund, P. (2007). Serious Games: An Overview. IKI Technical Reports. Skövde, Sweden: Institutionen för kommunikation och information. Retrieved May 7, 2009, from http://urn.kb.se/resolve?urn=urn:nbn:se:his:diva-1279.

Abstract: This report discusses some issues concerning serious games, that is, (digital) games used for purposes other than mere entertainment. The starting point is the serious games

concept itself, and what the actually means. Further, serious games allow learners to experience situations that are impossible in the real world for reasons of safety, cost, time, etc., but they are also claimed to have positive impacts on the players' development of a number of different skills. Subsequently, some possible positive (and negative) impacts of serious games are discussed. Further, some of the markets such games are used in are considered here, including, military games, government games, educational games, corporate games, and healthcare games. This report also identifies some (mainly academic) actors in the North American and the European serious games market. This report is part of the DISTRICT (Developing Industrial Strategies Through Innovative Cluster and Technologies) project: Serious Games Cluster and Business Network (SER3VG), which is part of the Interreg IIIC Programme.

Tait, A. (1992). Desktop virtual reality. In Using Virtual Worlds, IEE Colloquium on (pp. 5/1-5/5).

Abstract: This paper defines what is meant by desktop virtual reality and how it provides an alternative to immersion VR systems. It then goes on to cite specific user examples as a means of exploring how various organizations are using desktop VR to author their own virtual worlds. It must be appreciated that the act of authoring a virtual world is in itself a very visual activity, and thus difficult to describe in detail in text format

Tapley, R. (2007). Designing your second life: techniques and inspiration for you to design your ideal parallel universe within the online community, Second Life. Indianapolis, IN: New Riders.

Summary: A guide to the online environment of Second Life details how to design avatars, clothing, home, and land and provides tips for creating a profile and following correct etiquette, manners, and customs.

Taylor, S. (2007). Sistine Chapel in Second Life. Retrieved November 24, 2007, from Academic Commons Web site: http://www.academiccommons.org/commons/showcase/sistine-chapel-in-second-life

Terdiman, D. (2005). Second Life Teaches Life Lessons. Retrieved November 24, 2007, from Wired Web site: http://www.wired.com/gaming/gamingreviews/news/2005/04/67142

Thavikulwat, P. (1999). Developing Computerized Business Gaming Simulations. Simulation & Gaming, 30(3), 361. Retrieved from Academic Search Complete database.

Abstract: A paradigm for developing computerized business gaming simulations is discussed. Simulation is defined as a replicable representation of a process. Phenotypical representation, or modeling, is distinguished from genotypical representation, or gaming. Definitions of a configurable game, strategy, tactic, and entrepreneurship as they relate to specific games are presented. Gaming simulations should be evaluated on how well they support the genotypical representation of the processes that define the subject of interest. Computerized business gaming simulations may be more appropriate for the assessment of business education than for the enhancement of that education.

Thomas, D., & Brown, J. S. (2007). The Play of Imagination: Extending the Literary Mind. Games and Culture, 2(2), 149-172. doi: 10.1177/1555412007299458.

Abstract: As games, particularly virtual worlds, become increasingly popular and as they begin to approximate large scale social systems in size and nature, they have also become spaces where play and learning have merged in fundamental ways. More important is the idea that the kind of learning that happens in the spaces of these massively multiplayer online games is fundamentally different than what we have come to consider as standard pedagogical practice. The distinction the authors make is that traditional paradigms of instruction have addressed learning as "learning about," while these new forms of learning deal with knowledge through the dynamic of "learning to be."It is the authors' contention that the experiences offered within virtual worlds provide a fundamentally different way of thinking about learning that may provide some keys to the development of future pedagogical practice.

Thompson, B. (2008, November 25). Moving to the Second Classroom. BBC. Retrieved February 27, 2009, from http://news.bbc.co.uk/2/hi/technology/7747951.stm.

Tiffin, J., & Rajasingham, L. (1995). In search of the virtual class: education in an information society. New York: Routledge.

Summary: In a challenging yet enlightening exploration of the demands of a new era, In Search of the Virtual Class presents a vision of what education and training could become as information technology develops. Authors John Tiffin and Lalita Rajasingham examine the nature of the classroom as a remarkably powerful communication system, irreplaceable even today by alternative communication technology, such as educational television or computer-assisted instruction. Yet they point to a future possibility, contingent on the further development of information superhighways, which could offer a serious alternative to the classroom.

Underwood, J. (2009). LeverageTM: Using In-Game Data to Assess Learning. American Educational Research Association Annual Meeting – San Diego, CA.

Van Brackle, D., & et. al. (1991). GISMO: a game for intelligent simulated military opponents. Orlando, FL: Institute for Simulation and Training, University of Central Florida.

Summary: Report discusses GISMO, the Game for Intelligent Simulated Military Opponents, which acts as a testing platform for intelligent simulated force algorithms.

Van Dam, A. (1997). Three-dimensional user interfaces for immersive virtual reality: final report. Providence, RI: Brown University Computer Graphics Group.

Van Eck, R. (2006). An Instructional Designer Looks at Digital Game-Based Learning. ELI Web Seminar, June 2006.

Abstract: The potential of digital game-based learning remains largely unrealized, in part because designers of "edutainment" games have never understood how and why games are effective and how to align curriculum with the game world without "sucking the fun out" of the games (according to Marc Prensky). This has led some to believe that educators and instructional

designers should never be allowed near a game. The failures of the edutainment industry largely result from poorly understood theory and a lack of alignment between the worlds of education and games. Games succeed precisely because they employ sound pedagogical approaches such as situated cognition, cognitive disequilibrium, and scaffolding to teach what is needed to succeed in the game. By examining the underlying principles of games and aligning them with educational theory and learning outcomes, it IS possible to create effective blended game-based learning. Instructional design is ideally positioned to guide this process. This presentation will provide an overview of some of the theories that underlie games AND effective learning and explain how to align these two worlds.

Van Eck, R. (2006). Digital Game-Based Learning: It's Not Just the Digital Natives Who Are Restless. EDUCASE Review, 41(2). 16-30. Retrieved March 15, 2009, from http://www.educause.edu/EDUCAUSE+Review/EDUCAUSEReviewMagazineVolume41/DigitalGameBasedLearningItsNot/158041.

Van Eck, R. (2007). Generation G and the 21st Century. ELI Spring Focus Session, Immersive Learning Environments: New Path to Interaction and Engagement, March 27-28, 2007.

        Abstract: The growing use of games in learning may signal a new pedagogical approach to educating the millennial generation. We'll examine the theory behind the effectiveness of games; what the past can teach us about if, how, and when to implement digital game-based learning; and what this will mean for schools.

Van Eck, R. (2005). What Are We Playing At?: What It Means to Integrate Games into the Curriculum, and Why We Should. Seminars on Academic Computing (SAC), August 2005. Retrieved March 15, 2009 from http://net.educause.edu/ir/library/pdf/SAC0513.pdf.

Vogel, J.F., Vogel, D.S., Cannon-Bowers, J., Bowers, C.A., Muse, K., & Wright, M. (2006). Computer gaming and interactive simulations for learning: A meta-analysis. *Journal of Educational Computing Research*, *34*(3), 229-243.

von Wangenheim, C. and Shull, F. (2009, March). To Game or Not to Game? *IEEE Software*, 26(2), 92-94.

Walrath, D. J. (2008). Complex systems in engineering and technology education: A mixed methods study investigating the role computer simulations serve in student learning. Utah State University. Retrieved from ProQuest Dissertations & Theses Database.

        Abstract: This research was conducted to determine if students receiving complex systems instruction in the form of software simulations recognize patterns and underlying elements of complex systems more effectively than students receiving traditional instruction. Complex systems were investigated with an analytic (reductive) approach in a control group and with a synthesis approach in the treatment group. Exploration of this top-down approach to learning complex systems counters traditional bottom-up methodologies, investigating systems and subsystems at the component level. The hypothesis was that students experiencing complex systems scenarios in a computer-based learning environment would outperform their counterparts by constructing a greater number of explanations with emergent-like responses. A

mixed method experimental, pretest posttest, control group triangulation design research study was designed for high school students enrolled in an Introduction to Technology and Engineering course. A pretest consisting of one open-ended near transfer problem and one far transfer problem was administered, investigating the generation of reductive (clockwork) and complex (emergent-like) mental models. A stratified sampling procedure was used to assign students to control or treatment groups. Following treatment, an analysis of covariance failed to reveal statistically significant evidence supporting the hypothesis. However, qualitative data in the form of student transcriptions, daily lab reports, and data entry worksheets revealed evidence of emergent-like response and behaviors.

Warger, T. (2007). Why Are Simulations Not More Popular? Edutech Report, 23(11), 7. Retrieved from Academic Search Complete database.

Abstract: The article reports on factors for simulations' unpopularity. According to most faculty and students, simulations are unpopular because they are "artificial" and "abstract". Their complexity, and high cost discourage teachers to write simulation programs. Other factors include lack of visual realism, and non-integration into pedagogy.

Weber, A., Rufer-Bach, K., & Platel, R. (2008). Creating your world: the official guide to advanced content creation for Second life. Indianapolis, IN: Wiley Publishing.

Description: The book includes details on how to design and use Second Life content, covering such important skills as building, texturing, scripting, animating, and terraforming and discusses how to create scripts to communicate and interact with the world and manage data.

Westera, W., Nadolski, R. J., Hummel, H. G. K., & Wopereis, I. G. J. H. (2008). Serious Games for Higher Education: A Framework for Reducing Design Complexity. Journal of Computer Assisted Learning, 24(5), 420-432.

Abstract: Serious games open up many new opportunities for complex skills learning in higher education. The inherent complexity of such games, though, requires large efforts for their development. This paper presents a framework for serious game design, which aims to reduce the design complexity at conceptual, technical and practical levels. The approach focuses on a relevant subset of serious games labeled as scenario-based games. At the conceptual level, it identifies the basic elements that make up the static game configuration; it also describes the game dynamics, i.e. the state changes of the various game components in the course of time. At the technical level, it presents a basic system architecture, which comprises various building tools. Various building tools will be explained and illustrated with technical implementations that are part of the Emergo toolkit for scenario-based game development. At the practical level, a set of design principles are presented for controlling and reducing game design complexity. The principles cover the topics of game structure, feedback and game representation, respectively. Practical application of the framework and the associated toolkit is briefly reported and evaluated.

Weiss, J. et al. (2006). The international handbook of virtual learning environments. New York: Springer.

Description: What is virtual reality and how do we conceptualize, create, use, and inquire into learning settings that capture the possibilities of virtual life? The International Handbook of Virtual Learning Environments was developed to explore Virtual Learning Environments (VLE's), and their relationships with digital, in real life and virtual worlds. Three issues are explored and used as organizers for The Handbook. First, a distinction is made between virtual learning and learning virtually. Second, since the focus is on learning, an educational framework is developed as a means of bringing coherence to the available literature. Third, learning is defined broadly as a process of knowledge creation for transforming experience to reflect different facets of "the curriculum of life". To reflect these issues The Handbook is divided into four sections: Foundations of Virtual Learning Environments; Schooling, Professional Learning and Knowledge Management; Out-of-School Learning Environments; and Challenges for Virtual Learning Environments. A variety of chapters representing different academic and professional fields are included. These chapters cover topics ranging from philosophical perspectives, historical, sociological, political and educational analyses, case studies from practical and research settings, as well as several provocative 'classics' originally published in other settings.

Wenger, S. (2009). Education: virtual education. Topeka, KS: Kansas Legislative Research Department.

White, B. (1981). Designing computer games to facilitate learning. Thesis. Artificial Intelligence Laboratory, Massachusetts Institute of Technology.

Abstract: The aim of this thesis was to explore the design of interactive computer learning environments. The particular learning domain selected was Newtonian dynamics. Newtonian dynamics was chosen because it is an important area of physics with which many students have difficulty and because controlling Newtonian motion takes advantage of the computers graphics and interactive capabilities. The learning environment involved games which simulated the motion of a spaceship on a display screen. The purpose of the games was to focus the students' attention on various aspects of the implications of Newton's laws.

Whitehouse, K. (2005). Web-Enabled Simulations: Exploring the Learning Process. *EDUCAUSE Quarterly, 28*(3). 20–29. Retrieved April 15, 2009 from http://www.educause.edu/EDUCAUSE+Quarterly/EDUCAUSEQuarterlyMagazineVolum/Web EnabledSimulationsExploring/157358.

Wickens, C. (1992). Virtual reality and education. In Systems, Man and Cybernetics, 1992., IEEE International Conference on (pp. 842-847 vol.1). doi: 10.1109/ICSMC.1992.271688.

Abstract: Five components of the virtual reality (VR) concept are analytically defined: 3-D perspective, dynamic rendering, closed loop interaction, inside-out perspective, and enhanced sensory feedback. It is argued on the basis of empirical data from a variety of sources that those components that improve performance by reducing effort may actually inhibit learning or long term retention. Closed loop interaction in contrast, while not reducing effort, appears to have a

beneficial effect on retention. The importance for learning of directing users attention to the link between the VR perspective and a more artificial perspective is also highlighted

Winn, B., & Heeter, C. (2006). Resolving Conflicts in Educational Game Design Through Playtesting. Innovate, 3(2).

Abstract: Educational game designs must balance the often conflicting values of game designers, instructional designers, and content experts. In order to reach this balance, however, colleagues should adopt development strategies that already inform the design of commercial computer games. Commercial game designers recognize that great games are not created by simply envisioning a game, writing a requirements document, and then building it precisely to match the initial specifications. They further recognize that iterative design informed by frequent playtesting is critical to providing an engaging play experience. In illustrating how such practice can inform a collaborative approach to educational game design, Brian Winn and Carrie Heeter outline the development of an educational game designed to meet national science education standards for 7th, 8th, and 9th grade students. They illustrate how playtesting serves an even broader role in educational game design by helping resolve disagreements between gameplay, pedagogy, and content experts. In the project they describe, each group of experts holds some absolute veto power (e.g., the science cannot be wrong); other areas of disagreement, however, require additional negotiation and testing before they can be resolved. Winn and Heeter outline this process of development through three prototypes of the learning game, and they delineate the nine key decisions that resulted in a final version that most successfully resolved the aims of project participants while receiving the most positive feedback from student testing groups.

Winn, W., & Jackson, R. (1999). Fourteen Propositions about Educational Uses of Virtual Reality. Educational Technology, 39(4), 5-14.

Abstract: Offers propositions about virtual reality in education, ranging from costs to the psychological affordances of virtual environments (VEs). Some of the propositions arise from empirical studies of performance and cognition in VEs; others come from behavioral, cognitive, and human-factors research. Much of the research is from the Human Interface Technology Laboratory (HITL) at the University of Washington in Seattle.

Wolfe, J. (1997). The effectiveness of business games in strategic management course work. *Simulation & Gaming*, *28*(4), 360-376.

Wolf, M. J. P. (2002). The Medium of the Video Game. Austin, TX: University of Texas Press.

Description: Over a mere three decades, the video game has become the entertainment medium of choice for millions of people, who now spend more time in the interactive virtual world of games than they do in watching movies or even television. The release of new games or game-playing equipment, such as the PlayStation 2, generates great excitement and even buying frenzies. Yet, until now, this giant on the popular culture landscape has received little in-depth study or analysis. In this book, Mark J. P. Wolf and four other scholars conduct the first thorough investigation of the video game as an artistic medium. The book begins with an attempt to define what is meant by the term "video game" and the variety of modes of production within the medium. It moves on to a brief history of the video game, then applies the tools of film studies to

look at the medium in terms of the formal aspects of space, time, narrative, and genre. The book also considers the video game as a cultural entity, object of museum curation, and repository of psychological archetypes. It closes with a list of video game research resources for further study.

Wolf, M. J. P., & Perron, B. (2003). The video game theory reader. New York: Routledge.

   Description: In the early days of Pong and Pac Man, video games appeared to be little more than an idle pastime. Today, video games make up a $20 billion dollar industry that rivals television and film, and their influence is felt throughout all aspects of popular culture. The Video Game Theory Reader brings together exciting new work on video games as a unique medium and nascent field of study--one that is rapidly developing new modes of understanding and analysis, like film studies in the 1960s and television studies in the 1980s. This pioneering collection addresses the many ways video games are reshaping the face of entertainment and our relationship with technology. In the volume, leading media studies scholars develop new theoretical tools and concepts to study video games. Drawing upon examples from widely popular games ranging from Space Invaders to Final Fantasy and Combat Flight Simulator, the contributors discuss the relationship between video games and other media; the shift from third- to first-person games; gamers and the gaming community; and the important sociological, cultural, industrial, and economic issues that surround gaming. Accompanied by an extensive listing of all home gaming consoles developed over thirty years since the birth of the video game in 1972, The Video Game Theory Reader is essential reading for scholars, gaming enthusiasts, and anyone interested in understanding the ever-changing world of digital entertainment.

Wolfenstein, M., Dikkers, S., Halverson, R. (2009). My Raid Leader, My Teacher: What We Can Learn About Schools From Guild Leadership. American Educational Research Association Annual Meeting – San Diego, CA.

Wright, P. (2009). Trainee Teachers' e-Learning Experiences of Computer Play. Innovate, 5(4).

   Abstract: Pam Wright highlights the role of technology in providing situated learning opportunities for preservice teachers to explore the role commercial computer games may have in primary education. In a study designed to assess the effectiveness of an online unit on gaming incorporated into a course on learning technologies, Wright found that thoughtful instructional design, scaffolded activities, and focused facilitation can have a great effect on preservice teachers' attitudes toward and understanding of the pedagogical uses of commercial computer games.

WSC07 (2007). Retrieved November 24, 2007, from Winter Simulation Conference Web site: http://www.wintersim.org/index.htm.

Wu, S. (2008). Reducing unproductive learning activities in serious games for second language acquisition. University of Southern California. Retrieved from ProQuest Dissertations & Theses Database.

   Abstract: Recent years have seen a large number of game-based training systems or serious games developed for diversified learning domains. Despite the hypothesis that computer games are motivator to promote learning engagement, however, researchers reported various

problems existing in these systems. One of the intractable problems, for example, is that games incentives may direct learners to unproductive learning activities, diverging from the original intention of educational software designers. Skeptics began to question the worth of employing game techniques in training systems, as constructing a serious game faces relatively longer development cycle and consumes more expensive resources. Do unproductive learning activities in serious games falsify the hypothesis that games can promote learning? What kind of learners can benefit from the didactics of learning by playing? What design issues should be taken into consideration in order to reduce these unproductive activities? To what extent can pedagogy harness the power of computer games and still preserve their fun elements? This thesis attempts to answer these questions through in-depth research on improving the learning productivity of serious games. Iterative exploratory studies were carried for evaluating the training results and validating the design of a particular serious game, called the Tactical Language & Culture Training System (TLCTS), which coaches adult learners to rapidly acquire spoken communication skills. Evidence of the previous study was used to establish the hypothesis for the next controlled study, which further serves as the basis of qualitative and quantitative analysis on the generic issues of low learning productivity in serious games. Based on the analysis, this thesis presents a pedagogical framework tailored for serious game applications, which incorporate customized curriculum contents, implicit and explicit feedback, game scoring, scaffolding and fading, online student assessment, performance summarization as well as tutor advice facilities. This thesis also provides implementation details of this framework as a case study. Preliminary results on adoption of this framework indicate that it helps reduce unproductive learning activities. We conclude that serious games should be engineered as coherent whole that harmonizes the cognitive and game design principles rather than a mere container of the curriculum contents.

Yahaya, R. (2007). Immersive virtual reality learning environment: learning decision-making skills in a virtual reality-enhanced learning environment. Dissertation. Queensland University of Technology, Centre for Learning Innovation. Retrieved May 10, 2009 from http://eprints.qut.edu.au/16489/1/01front.pdf.

Abstract: New advances in computer programming and more powerful technology have opened up new opportunities for learning though immersive virtual reality simulations. This research highlighted the importance of the role of a lecturer in fostering learning in a technology rich learning environment. Undergraduate business studies students worked collectively to try resolve a problem depicted through an immersive simulation involving a burning factory. The simulation provided a rich personal experience that enabled students with lecturer support to generate effective strategies to address the problem.

Yang, S., Smith, B., & Graham, G. (2008). Healthy Video Gaming: Oxymoron or Possibility? Innovate, 4(4).

Abstract: Stephen Yang, Brian Smith, and George Graham explore the potential of exergames as a tool to combat the growing problem of childhood and adolescent obesity. Exergames rely on sensing technology that allows on-screen activity to be controlled through physical activity, rather than through operation of a handheld controller. Researchers frequently correlate increasing childhood obesity with a drastic increase in the popularity and ubiquity of video game systems; however, Konami's Dance Dance Revolution (DDR), a game that requires

players to accumulate points by coordinating body movements with onscreen cues, has been credited with helping some teens lose weight and improve their health. Suggesting that games like DDR and game systems like Nintendo's Wii may appeal to young people who resist more accepted forms of exercise, Yang, Smith, and Graham explore the potential power of these games to encourage children and youth to be physically active. After a survey of game controllers, consoles, and software available and in development, the authors conclude with a call for further research, including a cost-benefit analysis of the viability of including such games in school physical education programs.

Ye, E., Liu, C., & Polack-Wahl, J. A. (2007). Enhancing Software Engineering Education Using Teaching Aids in 3-D Online Virtual Worlds. 37th ASEE/IEEE Frontiers in Education Conference, October 10-13, 2007. Retrieved March 5, 2009 from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.92.5560&rep=rep1&type=pdf.

Abstract: Three-dimensional Online Virtual Worlds such as Second Life support avatar-based communications, a wide spectrum of online activities, and development of various in-world teaching and learning tools. We have experimented with Second Life in two computer science classes, one at Ohio University, the other at the University of Mary Washington, to enhance software engineering education. We used Second Life as an innovative collaboration and communication tool both in and outside classroom to help facilitate teamwork and interactions among student project team members. Second Life was also used as the virtual office for instructors and teaching assistants to answer students' questions during office hours. In addition, we developed two multi-player online software engineering educational games in Second Life, one based on the Groupthink software specification exercise developed at M.I.T., and the other based on the SimSE game (a 2-D single player game) developed at UC Irvine. By playing these two games, students learned fundamentals of software specification activities and principles of software development processes. In the paper, we will share our experience of using Second Life in two software engineering classes, and discuss its pros and cons based on the data collected from student surveys.

Yeh, Y. (2004). Nurturing reflective teaching during critical-thinking instruction in a computer simulation program. Computers & Education, 42(2), 181-195. doi: 10.1016/S0360-1315(03)00071-X.

Abstract: Nurturing reflective teaching and improving critical-thinking instruction are two important goals in teacher education, but these are only achievable when teachers-in-training are provided with opportunities for building professional knowledge and for exhibiting reflective teaching practices. A computer simulation program (CS-TGCTS) was therefore developed here, and its effectiveness is explained in this study. From 149 preservice teachers participating in this study, a pretest–posttest control group design was defined by four student groups and two treatments. The central hypothesis was that increasing participants' self-awareness of teacher behaviors and enhancing mindful learning in professional knowledge would provoke reflective teaching and further bring about improvements in teacher behaviors. The findings support the hypothesis and suggest that the CS-TGCTS simulation is an effective vehicle for improving preservice teachers' reflective teaching in critical-thinking instruction.

Young, M., Schrader, P. G., & Zheng, D. (2006). MMOGs as Learning Environments: An Ecological Journey into <i>Quest Atlantis</i> and <i>The Sims Online</i>. Innovate, 2(4).

Abstract: Michael Young, P. G. Schrader, and Dongping Zheng use the concepts of ecological psychology to examine how massively multiplayer online games (MMOGs) promote specific learning processes in their players. In their analysis they identify and define nine principles of learning that allow such games to have valuable potential as tools for educators: the perception-action cycle, embodied cognition, social attributes of situated learning, boundary constraints on behavioral trajectories, affordance-effectivity duals, goal-directed action, contextualized learning, repetition, and detection of the raison d'être. They then provide examples of these principles in the case of two MMOGs—The Sims Online and Quest Atlantis—in order to illustrate the potential of this technology to enhance student learning in educational contexts.

Zagal, J. P. (2007). Learning about videogames: Implications for learning from videogames. OECD Expert Meeting on Videogames and Education. Santiago, Chile: OECD-CERI. Retrieved May 16, 2009, from http://www.oecd.org/dataoecd/43/62/39414900.pdf.

Zapata-Rivera, D. (2009). Assessment-Based Gaming Environments. American Educational Research Association Annual Meeting – San Diego, CA.

Zapata-Rivera, D., Hansen, E. (2009). Analyzing the Learning Potential of Existing Games Using Evidence-Centered Design and Cognitive Task Analysis. American Educational Research Association Annual Meeting – San Diego, CA.

Zavaleta, J., Costa, M., Gouvea, M. T., & Lima, C. (2005). Computer Games as a Teaching Strategy. In Proceedings of the Fifth IEEE International Conference on Advanced Learning Technologies (pp. 257-259). IEEE Computer Society. doi: 10.1109/ICALT.2005.88

Abstract: The computer gaming technology presents itself as an important supporting strategy to new forms of teaching and learning, and can be applied in the various areas of knowledge, particularly in teaching Mathematics. This study will present the results obtained regarding the research about using the computer game NumerAmigos® in the teaching/learning of elementary algebra when transitioning from the arithmetic reasoning to the algebraic reasoning.

Zibit, M., & Gibson, D. (2005). simSchool: The Game of Teaching. Innovate, 1(6).

Abstract: Melanie Zibit and David Gibson describe simSchool, a video game that prepares teachers for the complexities of teaching in the classroom, particularly in the areas of differentiating instruction, classroom management, and adapting teaching to multiple cognitive abilities. The authors illustrate how the game's non-player characters (i.e., the virtual students) incorporate a diverse range of cognitive, demographic, and behavioral variables that react to the player's actions. Through such a design, simSchool offers a "simulated apprenticeship" that prepares teachers to practice the informed decision making required for success in their profession.

Zuiker, S. (2009). Assessment for ―Learning to Be‖ in Educational Videogames. American Educational Research Association Annual Meeting – San Diego, CA.

Zyda, M. (2005, September). From Visual Simulation to Virtual Reality to Games, *Computer*, 38(9), 25-32.

Zyda, M. (2007, July). Creating a Science of Games. *Communications of the ACM*, *50*(7), 36-42.

Zyda, M., Spraragen, M., Ranganathan, B. (2009, April). Testing Behavioral Models with an Online Game. *Computer*, *42*(4), 103-105.

Miscellaneous organizations and projects

The Association of Virtual Worlds
http://www.associationofvirtualworlds.com/

The Association of Virtual Worlds believes that virtual worlds represent a major information and technological revolution in how we work, play and live. The Association mission is to serve those companies and individuals who are dedicated to the advancement of this multi-billion dollar global industry and reach out to those who have not yet found virtual worlds.

Cisco's Blog on Virtual Worlds
http://blogs.cisco.com/virtualworlds

The Education Arcade
http://educationarcade.org/

The Education Arcade explores games that promote learning through authentic and engaging play. TEA's research and development projects focus both on the learning that naturally occurs in popular commercial games, and on the design of games that more vigorously address the educational needs of players. Our mission is to demonstrate the social, cultural, and educational potentials of videogames by initiating new game development projects, coordinating interdisciplinary research efforts, and informing public conversations about the broader and sometimes unexpected uses of this emerging art form in education. Education Arcade projects have touched on mathematics, science, history, literacy, and language learning, and have been tailored to a wide range of ages. They have been designed for personal computers, handheld devices and on-line delivery.

The Federal Consortium for Virtual Worlds
http://www.ndu.edu/IRMC/fedconsortium.html

FCVW consists of members from government (federal, state & local, & international), academia, and corporate sectors. The Consortium supports individuals and organizations to

improve government collaboration through the use of virtual worlds to enrich collaborative online experiences. It provides a venue to share best practices and lessons learned for the collaborative use of virtual worlds, address common challenges, and create structures to share resources. Communication channels include an email announcements list, wiki knowledge base, and events.

Metaverse Roadmap
http://metaverseroadmap.org/

The Metaverse Roadmap (MVR) is the first public ten-year forecast and visioning survey of 3D Web technologies, applications, markets, and potential social impacts. Areas of exploration include the convergence of Web applications with networked computer games and virtual worlds, the use of 3D creation and animation tools in virtual environments, digital mapping, artificial life, and the underlying trends in hardware, software, connectivity, business innovation and social adoption that will drive the transformation of the World Wide Web in the coming decade.

ScienceSpace
http://virtual.gmu.edu/

The purpose of Project ScienceSpace is to explore the strengths and limits of virtual reality (sensory immersion, 3-D representation) as a medium for science education. This project is a joint research venture among George Mason University, the University of Houston, and NASA's Johnson Space Center. Dr. Chris Dede from George Mason University is the project Co-Principal Investigator and has developed this web site; Dr. R. Bowen Loftin of the University of Houston is the Principal investigator. Our study is funded by the Applications of Advanced Technology Program at the National Science Foundation and also receives support from NASA.

Second Life in Education
http://sleducation.wikispaces.com/

This space was designed to provide an overview of the educational possibilities of virtual worlds, in particular Second Life.

Serious Games Applied Research Group, Coventry University
http://www.coventry.ac.uk/researchnet/d/440

Serious Games Source
http://seriousgamessource.com/

The Serious Games Source website was founded by the Think Services Game Group in March 2006 as the leading editorially-driven website specifically for the 'serious games' market (games created for training, health, government, military, educational and other uses). The site has expanded from the already successful 'serious games' coverage on sister website Gamasutra, is run as a complement to existing Think Services Game Group-run events the Serious Games Summit D.C. and GDC, and now publishes daily news and twice-weekly feature coverage on the cutting edge of the serious game business.

SimScience
http://simscience.org/

SimScience is a product of the NSF project Integration of Information Age Networking and Parallel Supercomputer Simulations into University General Science and K-12 Curricula. Specifically, this material is based upon work supported by the National Science Foundation under Grant No. 9523481. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

SLED Blog: K-20 Education Using the Second Life World
http://sl-educationblog.org/

A blog dedicated to the ins and outs of K-20 education using the Second Life® world. This blog is written by educators and for educators, for those who are seasoned Second Life veterans and for those just starting out, for those who are die-hards and those who are skeptics. All are welcome. We hope you'll read, enjoy, and comment on what you see.

Virtual Worlds Connect
http://www.virtualworldsconnect.com/

The community for professionals involved in the metaverse and virtual worlds industry. By the people that bring you VirtualWorldsNews.com.