

World Future Society Conference

Boston, Massachusetts, July 8-10, 2010

Summary and Resources

compiled by Diana Kelly

Higher Education in the Future

- More students prefer online courses (even taking them from dorm rooms).
- The role of the “campus” will need to be reconsidered – it may not be sustainable.
- “Second Life” is being used to bring people together in business meetings, and could be used in higher education.
- The role of faculty will be changing away from being “content providers” because content is being provided through many sources (see below PLE and Open Courseware). Faculty will have a more important role as coaches, guides, facilitators of learning.
- Some learning software has been developed as games – with motivators to keep learners “playing,” instant feedback with points, etc.

Personalized Learning Environments (PLE) and Open Courseware

- Students are learning by using free online resources through open courseware providers.
- The Kahn Academy on YouTube is used by students for help with Math concepts.
- Students are learning collaboratively with others via online learning networks.
- Personalized Learning Environments (PLE) will become more important than Virtual Learning Environments (VLE) in allowing students to choose what and how they learn.

Learning Skills for the Future

- Computers are good at doing logical work, computations, and finding information. For this reason, those skills will be less important in the future.
- Students need to develop problem-solving skills and critical-thinking skills.
- Creativity is an important skill for the future – developing new ways of doing things.

Internet and Learning/Brain Development

- There is agreement that using the internet and Google has affected how people learn. There is disagreement about whether this is positive or negative for learning.
- Attention span issues affect learning in traditional modes.
- Students are learning in new ways that take advantage of new technologies.

Net Generation/Millennials

- Today’s young college students have grown up with instant information via cell phones, internet, etc., and they expect things to happen instantly.
- Young people get feedback instantly via Facebook and other social networks – they expect feedback instantly (good or bad) because they want to know how they measure up.
- Some young people have become addicted to being connected, and treatment centers have been established to help this addiction.

Online Collaboration

- “The wisdom of crowds” is used via online polls, Facebook Quora, Google Scholar Wave, Mozilla Raindrop and others.
- Young people regularly collaborate with others online.
- The development of information has become more social.

Augmented Reality

- Smart phones and special glasses can download information to show labels on buildings, people’s faces, etc.
- This technology has implications for travel and learning.
- There will be a great demand for people to develop content for “Augmented Reality.”

Gesture-based Computing

- Wii currently uses gestures for some of their recently-developed games.
- X-Box has developed “Kinect” as a gesture-based system (without a controller/joystick), using natural movements to play.

Artificial Intelligence and Robots

- Robots and robotic devices will become more important in the future.
- Humanoid robots have been developed at MIT and IBM, and some are used for learning.
- Artificial Intelligence is continuing to develop – developing computers that can learn and use human-like intuition. The developers are trying to emulate the functions of a human brain.
- Humans have robotic/AI implants today (Cochlear implants, brain implants for Parkinson’s Disease, robotic hands and arms, etc.) that interact with the brain. More will be coming in the future for enhanced powers.
- Robotics are being used in the military (unmanned aircraft, unmanned vehicles).
- Robots are being used to care for elderly in Asian countries.
- Moral and ethical issues related to robots will become more important in the future.

Internet – General

- 3-D internet is coming.
- Internet access in rural areas and developing countries is now possible through local wireless servers that broadcast over a 2-mile area.
- The role of the internet in American life has been studied by Pew, and shows great changes in the last ten years.

Internet and Cloud Computing

- “Cloud” computing is becoming more and more popular. Documents are used and stored online in an internet “cloud” and can be accessed anywhere by smart phones or laptops.

Future – General Future Research

- There is a market for future predictions.
- Futures Research has been done in all areas, and includes predictions about space tourism, synthetic life, environmental and social issues, the role of the internet and robots, etc.

Higher Education in the Future

- **WFS Conference Presentation** – Five Scenarios for the Futures of Academia – National Institute for Technology in Liberal Education (NITLE)
 - **Prezi Presentation:** <http://prezi.com/zrcjuf32ogbu/academia-in-2015-five-futures>
 - **Websites:** <http://www.nitle.org>
 - <http://nitleresearch.pbworks.com>
 - <https://blogs.nitle.org>
- **Horizon Report** – Trends in Teaching & Learning in Higher Education (EDUCAUSE and NITLE) – based on a Delphi process. <http://wp.nmc.org/horizon2010>
- **Book:** Anya Kamenetz - ***DIY U: Edupunks, Edupreneurs, and the Coming Transformation of Higher Education.*** (2010)
- **YouTube video:** Michael Wesch, Kansas State University: ***A Vision of Students Today*** (October 2007) <http://www.youtube.com/watch?v=dGCJ46vyR9o>
- **WFS Conference Presentation:** **Levers of Change in Higher Education**
 - <http://bit.ly/DigitalAge>
- **WFS Conference Presentation:** **Integrative Futures Education at the College Level**
 - **Website:** <http://www.centerforfutureconsciousness.com>
- **Rio Salado PASS program** – with student cohort groups. This is an accelerated AA degree program which uses Richard Paul’s critical thinking criteria, and it has been very successful.
 - **Website:** <http://www.riosalado.edu/programs/riopass/Pages/default.aspx>
- **Indira Gandhi National Open University, India** – successful/affordable online higher ed.
 - **Website:** <http://www.ignou.ac.in>
- **University of Central Florida** – “TeachME” Teacher Preparation Lab. Teachers gain experience in dealing with difficult students by working with the Student Avatars.
 - <http://www.insidehighered.com/news/2010/07/07/avatars>
- IBM’s “Second Life” campus for meetings and socializing:
<http://www.ibm.com/developerworks/opensource/library/os-social-secondlife/index.html?ca=drs->
- YouTube Video about the future of gaming by Jesse Schell, Carnegie Mellon University:
<http://www.youtube.com/watch?v=8FSsztwbRW0>
- New word: “Tweckle” (Tweet – heckle) – to abuse a speaker on Twitter. . . (Chronicle of Higher Ed -- <http://chronicle.com/article/Conference-Humiliation-/49185>)
- **Report:** Spellings Commission: ***A Test of Leadership: Charting the Future of Higher Education.*** (2006)
- **TEACH Act (2000)** – Technology Education and Copyright Harmonization Act – governs the use of copyrighted material for education.
 - http://depts.washington.edu/uwcopy/Copyright_Law/TEACH_Act

Personalized Learning Environments (PLE) and Open Courseware

- **EDUCAUSE:** 7 things you should know about PLEs --
<http://net.educause.edu/ir/library/pdf/ELI7049.pdf>
- **PLE Conference 2010, Barcelona** -- <http://pleconference.citilab.eu>

- International Journal of Virtual and Personal Learning Environments: <http://www.igi-global.com/Bookstore/TitleDetails.aspx?TitleId=1134&DetailsType=ReviewBoard>
- TED Talk: Kenneth Robinson's talk about personalized learning:
 - http://www.ted.com/talks/sir_ken_robinson_bring_on_the_revolution.html
- "Straighterline" – pay \$99/month plus \$39 per course – or Freshman year for \$999 (excluding textbook costs).
 - Website: <http://www.straighterline.com>
- P2PU – Peer to Peer University (no college credit – but the courses are free)
 - Website: <http://p2pu.org>
- Academic Earth – a compilation of all open courseware and lectures from top universities
 - Website: <http://academicearth.org>
- Kahn Academy on YouTube -- many YouTube videos on math and science concepts, freely available (students use these to study or reinforce difficult concepts)
 - Website: <http://www.khanacademy.org>
 - YouTube: <http://www.youtube.com/user/khanacademy?blend=1&ob=4>
- MOOC: Massively Open Online Course –
 - Website: <http://openeducationnews.org/2008/07/30/mooc-massive-open-online-course>
- SpacedEd: Helps students remember what they learn by asking them questions.
 - Website: <http://www.spaceded.com>
- Open Learning Initiative – Free materials for self-guided learning
 - Website: <http://oli.web.cmu.edu/openlearning>
- University of the People – The world's first tuition free online university, dedicated to the global advancement and democratization of education. It is not accredited and does not currently award degrees. Curriculum is designed as a BA program.
 - Website: <http://www.uopeople.org>
- MIT has made its course materials available online for free:
 - <http://ocw.mit.edu/index.htm>
- OECD (Organization for Economic Cooperation and Development) open courseware:
 - Website: <http://browse.oecdbookshop.org/oecd/pdfs/browseit/9607041E.PDF>
- The University of Iowa has an "E-Granary" digital Library:
 - U of Iowa "WiderNet" Project website: <http://ocw.mit.edu/index.htm>
 - E-Granary website: <http://www.widernet.org/eGranary>
- Universal Translation – this is built into "Second Life" and available through "Babblefish"
 - Second Life Website: <http://secondlife.com>
 - Yahoo Babelfish translation Website: <http://babelfish.yahoo.com>

Learning Skills for the Future

- Book: Howard Gardner: *Five Minds for the Future* (2008)
- Book: Nicholas Maxwell – *From Knowledge to Wisdom: A Revolution for Science and the Humanities* (2007)
- Book: Sondra Gayle Stein: *Equipped for the Future: A Customer-driven Vision for Adult Literacy and Lifelong Learning* (1995)
- Website: Harvard's "Project Zero" – studying cognitive development

- <http://www.pz.harvard.edu/History/History.htm>
- Website: Partnership for 21st Century Skills
 - <http://www.p21.org>
- Website: Win Wenger – modern Socratic teaching methods to accelerate learning
 - <http://www.winwenger.com/trulyaccelerated.htm>
- Website: Fostering 21st Century Skills through Problem-Solving International
 - <http://www.fpspi.org>

Internet and Learning/Brain Development

- Magazine article: Atlantic Magazine July 2008 – “Is Google Making Us Stupid?”
 - Website: <http://www.theatlantic.com/magazine/archive/2008/07/is-google-making-us-stupid/6868>
- Book: Nicholas Carr: *The Shallows: What the Internet is Doing to Our Brains*. (2010).
- Book: Clayton Christensen -- *Disrupting Class: How Disruptive Innovation will change the way the world learns* (2008)
- Book: Maggie Jackson and Bill McKibben – *Distracted: The Erosion of Attention and the Coming Dark Age* (2009)
- Book: Clay Shirky: *Cognitive Surplus: Creativity and Generosity in a Connected Age* (2010)
- Book: Frances Crick: *Astonishing Hypothesis: the Scientific Search for the Soul* (1994) – about brain research.
- Book: Steven Pinker, *How the Mind Works* (1999) – Harvard Behavioral Psychologist
- Book -- Professor Simon Baron-Cohen, University of Cambridge (Developmental Psychopathy), *The Essential Difference* (2004).
- Article: Brenda Patoine: *Brain Development in a Hyper-Tech World*. (August 2008) Dana Foundation: <http://www.dana.org/media/detail.aspx?id=13126>

Net Generation/Millennials

- Book: Don Tapscott: *Grown Up Digital: How the Net Generation is Changing Your World* (2008)
- Book: Don Tapscott: *Growing Up Digital: The Rise of the Net Generation* (1999)
- Beloit Mindset List: Description of the world in which the (college graduating) Class of 2010, 2011, 2012, etc. has grown up, showing their mindset. This is always released in August as the new “Class of ____” is entering college.
 - <http://www.beloit.edu/mindset>
- WFS Presentation -- Cultural Shifts among Global Youths. Weiner, Edrich , Brown, Inc, New York.
 - Website: <http://weineredrichbrown.com>
 - Blog (with resources): <http://weineredrichbrown.com/blog>
- “Heavensfield” treats addiction to the internet.
 - Website: <http://www.netaddictionrecovery.com>
- Amazon – “Mechanical Turks” – people log in and do a quick job.
 - <https://www.mturk.com/mturk/welcome>

Online Collaboration

- Quora on Facebook – can ask questions to a group. “A continually improving collection of questions and answers created, edited, and organized by everyone who uses it.”
 - <http://www.quora.com>
- Scholarly Waves for collaboration on projects and papers – like Google Wave
 - <http://wave.google.com/intro2.html>
- SAP Streamwork: <http://www.sapstreamwork.com>
- Mozilla Raindrop: <https://mozillalabs.com/raindrop>
- “Citizen Sky” project to work on solving mysteries of a star -- <http://www.citizensky.org>
- Book: John Seeley Brown and Paul Duguid – ***The Social Life of Information*** (2002)

Augmented Reality

- “Augmented Reality” – Layar, Netherlands – an application downloaded to smart phones (compatible with i-phone 3GS and Android) which lets you see labels on the buildings and people around you. <http://site.layar.com/company/blog/2010/07>
- Businesses make “layers” to market their company to prospective customers (eg; In & Out Burgers – developed by “Augment Reality” in the UK). <http://www.augmentreality.co.uk>
- Most of the “layer developers” are outside the U.S. These two are in the U.S.:
 - <http://www.winvolve.com>
 - <http://www.altwhatnow.com>
- Recognizr – Recognizes people and provides information about them – YouTube video: http://www.youtube.com/watch?v=5GqJHaNRlas&feature=player_embedded
 - Google Android and Layar demonstration – looking at buildings: <http://www.youtube.com/watch?v=ve3fEAX8hFU&feature=related>

Gesture-Based Computing

- MIT Media Lab has developed a mobile device that provides information about objects by walking up to any surface, projecting information, etc. – and can take photos by using natural gestures – called “Sixth Sense”:
http://www.ted.com/index.php/talks/pattie_maes_demos_the_sixth_sense.html
- Microsoft has developed “Kinect” – a hands-free controller for X-Box games in which players use their natural body movements. This will be released in November 2010. Video demo:
<http://www.xbox.com/en-US/kinect>

Artificial Intelligence and Robots

- Cyc Artificial Intelligence computer that thinks and solves problems -- <http://www.cyc.com> and <http://www.opencyc.org>
- Jabberwacky – An artificial intelligence online chat robot (“Chatbot”) – <http://www.jabberwacky.com/j2about>
- HP – Central Nervous System for the Earth (CeNSE)
<http://www.hp.com/hpinfo/globalcitizenship/enviro/techgallery.html?cense>
 - Videos:
http://h30418.www3.hp.com/?rf=sitemap&fr_story=d31e5c5530af1da3f9e075e2f772dce8c2687140&jumpid=req_R1002_USEN

- IBM has “Watson” – a super-computer that is able to beat players in a game of Jeopardy.
<http://www.watson.ibm.com/index.shtml>
- I-Sobot is the first mass-produced humanoid robot – released in 2007. It was demonstrated as a friendly learning toy used in learning language and phrases.
<http://www.isobotrobot.com/eng/news/index.html>
- I-Robot was developed in MIT’s Robot Lab. “I-Robot” makes the “Roomba” vacuum cleaner and defense-related tools.
<http://www.irobot.com>
 - TED talk by the developer of I-Robot:
http://cogsci.ucd.ie/introtocogsci/docs/brooks_life.pdf
- MIT Robotic Lab – Exhibit of “social” robots at MIT Museum:
<http://web.mit.edu/museum/exhibitions/robots.html>
- MIT Media Lab – Personal Robots Project Group:
<http://www.media.mit.edu/research/groups/personal-robots>
- “Cog” at MIT – a “learning” computer
<http://www.ai.mit.edu/projects/humanoid-robotics-group/cog>
- “Leonardo” – little personal/social robot for the home (MIT)
<http://robotic.media.mit.edu/projects/robots/leonardo/overview/overview.html>
- Kismet (MIT humanoid robot) has emotional interactions with humans, including improved speech and consciousness. <http://www.ai.mit.edu/projects/humanoid-robotics-group/kismet/kismet.html>
- GM is planning “semi-autonomous” (nearly driverless) cars by 2015.
 - <http://www.washingtonpost.com/wp-dyn/content/article/2010/05/31/AR2010053101915.html>
- Asimo – Honda’s humanoid robot - <http://world.honda.com/ASIMO>
 - <http://asimo.honda.com> (US website)
 - <http://asimo.honda.com/AsimoHistory.aspx>
 - YouTube video of Asimo:
<http://www.youtube.com/honda#p/c/2FEFAF55603817E7/14/hTiZYFrWP8A>
- IBM’s “autonomic computing” program: A computing system that senses its operating environment, models the behavior of the environment, and takes action to change the environment or its behavior. An autonomic computing system has the properties of self-configuration, self-healing, self-optimization, and self-protection.
<http://www.research.ibm.com/autonomic/overview>
- IBM “Blue Brain” project: replicate the brain in silicon (nano-section the neocortex) Website:
<http://bluebrain.epfl.ch>
- IBM has been developing a “brain simulator” in collaboration with Stanford University. It’s called “BlueMatter” and is currently on the scale of a cat’s brain. This is a step in the process of developing a “cognitive” computer chip.
 - <http://www-03.ibm.com/press/us/en/pressrelease/28842.wss>
 - <http://nextbigfuture.com/2009/11/ibm-has-achieved-cat-scale-brain.html>
- Cognitive Computing Blog: <http://modha.org>

- Hans Moravec, Robotics Institute of Carnegie Mellon University, predicts that there will be mass market utility robots by 2010, and fully intelligent robots by 2050.
 - Website: <http://www.frc.ri.cmu.edu/~hpm>
- DARPA (Defense Advanced Research Projects Agency), Smart Computer research includes five robotic vehicles completed for the DARPA urban challenge. These are unmanned defense vehicles that will be used in urban environments.
 - Website: http://www.darpa.mil/news/2010/UGV_April_2010.pdf
- Technologies of Consciousness -- <http://www.techcast.org/Commentary.aspx?ID=200>
- Book: Wendell Wallach & Colin Allen: ***Moral Machines – Teaching Robots Right from Wrong*** (2008). Ethical and moral issues about how robots that have the ability to learn can make decisions that could be harmful to people. They are programmed to learn how to make non-linear decisions (similar to “human intuition”). A philosopher was on the team.
 - Website: <http://www.yale.edu/bioethics>
- Book: Ray Kurzweil, ***How the Mind Works and How to Build One*** (forthcoming 2010)
- Book: Ray Kurzweil: ***The Singularity is Near: When Humans Transcend Biology*** (2005). Uses science to show how machines in humans will lead to super-human abilities.
- Book: Ray Kurzweil, ***The Age of Intelligent Machines***, 1992 (included info about the internet)
- “Singularity University” in Silicon Valley (funded by Google and others) has a focus of solving real problems in the world. This is a graduate institution, with an interdisciplinary approach, focusing on the future.
 - Website: <http://singularityu.org/about>
- Website – Ray Kurzweil: <http://www.kurzweilai.net>
 - WFS Presentation Powerpoint: <http://www.kurzweilai.net/pps/KurzweilPowerPoint>
- Stephen Thaler’s “Creativity Machine”
 - Website: <http://www.imagination-engines.com/thaler.htm>
 - Website: <http://www.imagination-engines.com/cm.htm>
- Website: Marshall Brain – Robotic Nation Essays
 - <http://www.marshallbrain.com/robotic-nation.htm>
- Book: Martin Ford – ***The Lights in the Tunnel: Automation, Accelerating Technology and the Economy of the Future*** (2009)
- Book: Marvin Minsky: ***The Emotion Machine: Commonsense Thinking, Artificial Intelligence, and the Future of the Human Mind*** (2008)
- Book: Gregory Paul and Earl Cox -- ***Beyond Humanity: Cyberevolution and Future Minds*** (1996)
- Book: P.W. Singer – ***Wired for War: The Robotics Revolution and Conflict in the 21st Century***. (2009)

Internet - General

- Website: The Pew Internet & American Life Project surveys started in 2000
www.imaginingtheinternet.org

- Internet and the future of Human Relations - New Pew report just released 2010:
<http://www.pewinternet.org/Presentations/2010/Feb/~//media/Files/Reports/2010/Future%20of%20internet%202010%20-%20AAAS%20paper.pdf>
- **Book:** John Smart – The Metaverse Roadmap – (about 3-d internet)
<http://www.metaverseroadmap.org>

Internet and Cloud Computing

- **Cloud Computing Definition** (National Institutes of Standards and Technology – NIST)
<http://csrc.nist.gov/groups/SNS/cloud-computing>
- **Article:** “Let it Rise” – the Economist – about storing things online --
http://www.economist.com/research/articlesbysubject/PrinterFriendly.cfm?story_id=12411882
- **Microsoft Research Project:** Gordon Bell – “My Life Bits” – about creating a lifetime store of everything, stored digitally. <http://research.microsoft.com/en-us/projects/mylifebits>
- **Cloud Computing White Paper by HP:**
<http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA2-9956ENW.pdf>

Future – General Future Research

- World Future Society website: <http://www.wfs.org>
- World Future Society 2010 Conference website: <http://www.wfs.org/2010main.htm>
- **Book:** C. Otto Scharmer: *Theory U: Leading from the Future as it Emerges* (2007)
- **Book:** Stewart Brand: *Whole Earth Discipline: An Ecopragmatist Manifesto* (2009)
- **Book:** James Kunstler: *The Long Emergency – Surviving the end of Oil, Climate Change, and other Converging Catastrophes of the 21st Century*. (2010)
- **Website** for Oceanographic Research - Woods Hole: <http://www.whoi.edu>
 - **WFS Presentation:** <http://www.whoi.edu/files/server.do?id=65547&pt=10&p=32973>
- There is a market for predictions (a futures market) in which people buy and sell shares based on future predictions (sometimes using online points/fake money, sometimes with small amounts of real money).
 - NITLE Markets game: <http://markets.nitle.org>
 - Iowa Prediction Market for Presidential Elections, University of Iowa **Website:** <http://www.biz.uiowa.edu/iem/index.cfm>
 - This includes an open access “Futures Market” educational game that can be used by classes, set up by teachers for Accounting, Economics, Finance, Marketing, and Political Science (one time \$5 fee per student)
<http://www.biz.uiowa.edu/iem/assignments/clsproc.html>
- In Europe they have developed a “Living Earth Simulator” – a knowledge accelerator which has been developed to predict and explore future options for a sustainable earth (in all aspects of Earth’s life, including natural resources, social problems, etc.)
 - Presentation, June 2010 http://www.futurict.ethz.ch/data/brussels_futurict_helbing.pdf
 - Article, Science Daily:
<http://www.sciencedaily.com/releases/2010/04/100427081051.htm>

- WFS Conference Presentation: Forecasting the Technology Revolution – The Latest TechCast Data.
 - Website: www.TechCast.org
 - Book: William Halal – ***Technology’s Promise: Expert Knowledge on the Transformation of Business and Society*** (2008)
- Space Tourism -- <http://www.techcast.org/BreakthroughAnalysis.aspx?ID=76>
 - By 2014 spaceships will carry tourists into high orbit.
 - “Spaceship One” – Virgin Galactic – Book your place in Space! They plan for five spacecraft by 2011. Cost \$20 million for a trip to the Space Station, or \$100 million for a trip to the moon.
 - Website: <http://www.virgingalactic.com>
 - YouTube video: http://www.youtube.com/watch?v=Z-FeuOvdK0E&feature=player_embedded#!
- Synthetic Life by 2021 – energy, environment, medicine – design and build biological systems “to order.” <http://www.techcast.org/Commentary.aspx?ID=195>
- Survey on Global Megacrisis -- <http://www.techcast.org/Commentary.aspx?ID=181>
- WFS Conference Presentation: The Virtualization of America (and the world) – Michael Rogers (Company “The Practical Futurist”)
 - http://www.michaelrogers.com/?utm_source=Google&utm_medium=cpc&utm_campaign=PracticalFuturist
 - Presentation preview prior to World Future Society: <http://www.bentley.com/en-US/Promo/Applied+Research/default.htm>