Generation G and the 21st Century

How Game are Preparing Today's Students for Tomorrow's Workplace

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An Introduction

✓ Born in 1964
- ✓ Gen X; outside range of digital native
- ✓ Digital Immigrant with DSL issues, but...

✓ Father a systems analyst
- ✓ Heathkit H8 running CPM

✓ A gamer
- ✓ First game was Cave/Adventure in 1976

✓ Disaffected student

✓ Last 11 yrs. technology in education/ID
- ✓ Technology is my job

✓ A lot in common with Gen Y/Generation G
- ✓ Technology is changing our world
- ✓ Schools and institutions are out of touch

✓ Past can guide, but must not constrain

Games & the Future

✓ Digital Game-Based Learning (DGBL) or Serious Games

   ✓ A means for engaging learners, teaching content, training for 21st century skills

   ✓ Three practical approaches

      ✓ Games are created by students

      ✓ Commercial games are integrated into the curriculum

      ✓ Educational games are built from scratch (serious games)

✓ Theory, practice, efficacy research not my purpose

✓ General overview of ideas, concepts, approaches

Additional Resources

✓ Research on effectiveness of games

    ✓ Using Computer Games and Simulations for Instruction: A Research Review By J.D. Fletcher and Sigmund Tobias Technical Report 2005-004

    ✓ Hays, R. (2005). Technical Report 2005-004: The Effectiveness of Instructional Games: A Literature Review and Discussion, Naval Air Warfare Center Training Systems Division. http://www.dtic.mil/

    ✓ O'Neil, H. F., Wainess, R., & Baker, E. L. (2005, December). Classification of learning outcomes: Evidence from the computer games literature. The Curriculum Journal, 16(4), 455-474.

✓ More on theory and practice

    ✓ Van Eck, R. (September, 2006). Building Intelligent Learning Games. In David Gibson, Clark Aldrich, & Marc Prensky (eds), Games and Simulations in Online Learning Research & Development Frameworks. Hershey, PA: Idea Group.

    ✓ Van Eck, R. (2006). "Six ideas in search of a discipline" in The Educational Design and Use of Computer Simulation Games.

    ✓ Van Eck, R. (2006). "Digital Game-Based Learning: It's not just the digital natives who are restless..." in EDUCAUSE Review, 41(2).

Overview

✓ Old Learners, New Learners

    ✓ Why game-based learning is Old School

    ✓ How technology has changed learners

    ✓ Why it's not as bad as some think

    ✓ Why our schools are failing these generations

✓ Old Learning, New Learning

    ✓ Learning 2.0

    ✓ Why games are effective

    ✓ How games teach 21st century skills

✓ Old Games, New Games

    ✓ How changes in games and technology point the way to the future

Old Learners, New Learners

Experiential Learning & Play, 400 B.C

✓ Latin
- ✓ Otium (all leisure activities)
  - ✓ Includes ludus
- ✓ Ludus
  - ✓ Games in the arena
  - ✓ Sports & competition
  - ✓ Olympic games
  - ✓ School

✓ Greek
- ✓ Word for otium = skole (school)
- ✓ Skole includes paideia (education)
- ✓ Play, games, leisure, & education all conceptually related

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Experiential Learning & Play, Middle Ages

✓ Renaissance philosophers

    ✓ Knowledge derived through interaction with the world

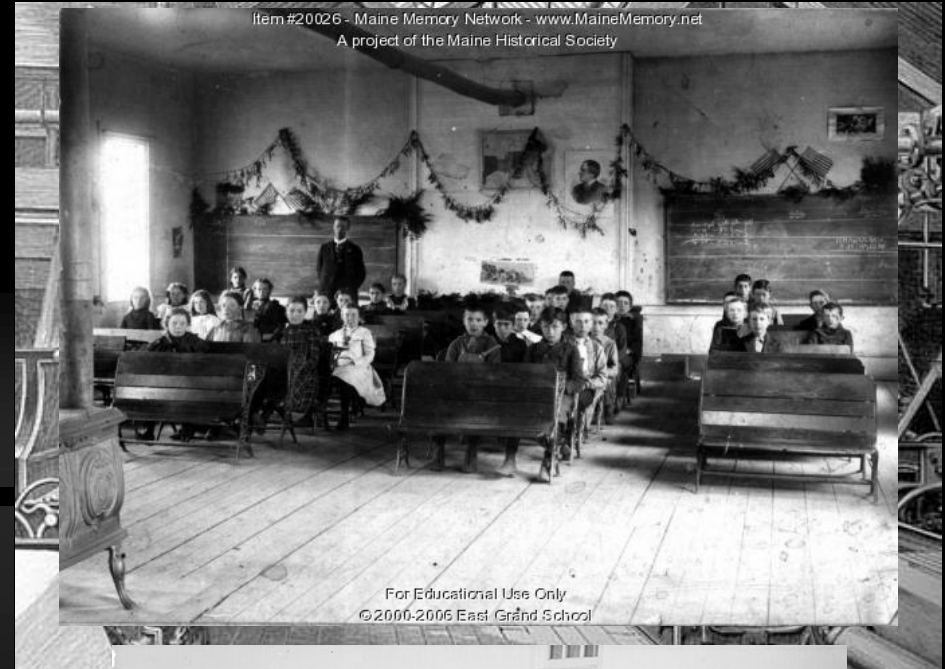   ✓ All knowledge connected & interrelated

✓ Master and apprentice

    ✓ Learning by doing

    ✓ Experiential learning

FIRST PRINTING-PRESS.

Experiential Learning & Play, 18th Century

✓ **Industrial Revolution**

    ✓ Mass production in industry leads to economies of scale

    ✓ Economies of scale lead to "widgetizing" of education & training

        ✓ Mass production model of learning

Item #20026 - Maine Memory Network - www.MaineMemory.net
A project of the Maine Historical Society

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Experiential Learning & Play, 20th Century

Pace of change in learners and technology
???
grows exponentially

Generation G & Technology

- ✓ Technology is what became available AFTER you were a teenager
    - ✓ For many born in the 20s and 30s,
        - ✓ radio and the telephone were technology
    - ✓ For many born in the 40s and 50s,
        - ✓ television was technology
    - ✓ For many born in the 60s and 70s,
        - ✓ computers and cell phones are technology
    - ✓ For many born in the 80s,
        - ✓ computer games, the Internet, and iPods are technology
    - ✓ For those born in the 90s and beyond...
        - ✓ NOTHING is technology yet
    - ✓ This includes texting, blogging, wikis, open-sourcing, RSS preferences, alternate reality gaming, Facebook, MySpace, Youtube...

Generational Differences in Online Activities

Activity	Online Teens (12-17 yrs.)	Gen Y (18-28 yrs.)	Gen X (29-40 yrs.)	Trailing Boomers (41-50 yrs.)	Leading Boomers (51-59 yrs.)
Online Gaming	81%	54%	37%	29%	25%
Instant Messaging	75	66	52	38	42
Text Messaging	38	60	44	29	15
Downloading Music	51	45	28	16	14
Reading Blogs	38	41	30	20	21
Downloading Video	31	27	22	14	8
Creating Blogs	19	20	9	3	9

How are Media & Technology Changing Us?

✓ Flynn effect

    ✓ Documented increase in IQ scores across all cultures that do standardized testing

        ✓ Cannot easily be attributed to education, nutrition, or other factors

        ✓ Cognitive complexity of mass entertainment like video games may be responsible (Johnson, 2005)
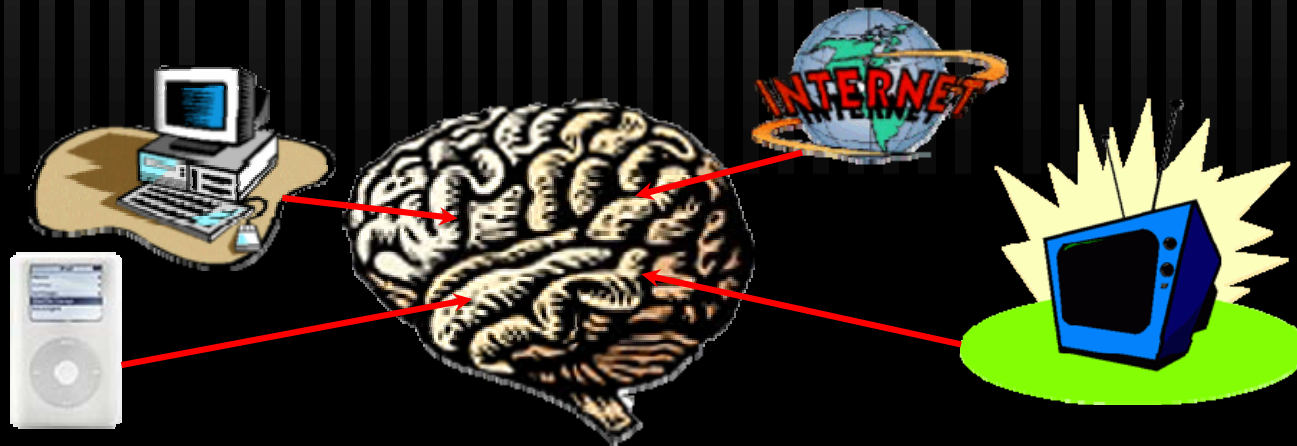
Square Pegs, Round Holes

✓   Generation G has experienced more change in 20 years than previous three generations combined

✓   Use of media and means of interaction has literally rewired the way they think

Buddhist's who chant / meditate for up to 10,000 hours emit gamma brain waves at 30 times what is considered normal.

The NIMH has reported that brain structure in modern children undergoes new grey matter growth just before or around puberty.

Many cite such studies as evidence that the extensive media use and multi-tasking of Generation G may be literally re-wiring their brains.

Education Hasn't Changed, but Learners Have

✓ "Who are these teens and twentysomethings running amok in our midst? If we choose to ignore them, will they eventually go away? Or, better yet, will they have to accept the traditional hierarchy and command-and-control leadership of corporate America? [...] there are 76 million reasons why you and your company cannot afford to think this way for another nanosecond."

Diane K. Danielson, "Welcome to the Matrix." Pink Magazine, August/September, 2006, page 77.

Gen X Takes a "Simple" Look @ Gen Y*

✓ We (Gen X) grew up

    ✓ Thinking nothing is permanent

    ✓ Watching marriages end in divorce

✓ Generation G grew up

    ✓ Getting awards for 8th place (or just for showing up)

    ✓ With first grade graduation ceremonies

Our parents watched men walk on the moon....

...their parents watched the Challenger explode.

Gen X Looks at Generation G

✓ These are significant events and differences that shape us

    ✓ WE are disillusioned, pessimistic, mistrustful

    ✓ THEY are optimistic, entitled, and "the most rewarded, recognized, and praised generation in living memory"

✓ As a result, we expect:

    ✓ our executives to be stealing from the corporation

    ✓ to work very hard while knowing we could be fired at any moment

✓ While they expect:

    ✓ the environment to adapt to them

    ✓ promotions after six weeks

Be Careful...

✓ Simple answers mask deep complexity

✓ Easy to dismiss Generation G as

    ✓ flighty

    ✓ spoiled

    ✓ unwilling to work

✓ Not true

    ✓ Actually possess 21st century skills

Gamers & 21st Century Skills?

✓"So our ability to recognize new patterns and adapt quickly to take advantage of situations as they occur and to respond to them better than other becomes more important all the time. Our ability to learn fast, implement, and execute directly correlates with our long-term success"*

✓--Michael Mussallem, CEO of Edwards Lifesciences, on finding the right talent and
✓skills to remain competitive in the 21st century

"Gamers have amassed thousands of hours of rapidly analyzing new situations, interacting with characters they don't really know, and solving problems quickly and independently."**

--Discovery Channel documentary on video game players

*   Bingham, T., & Galagan, P. (February, 2007). Finding the right talent for critical jobs. Training and Development, page 31.
** As quoted in Beck, J. C., & Wade, M. (2004). *Got Game: How the Generation is Reshaping Business Forever,* Boston: Harvard Business Press, pages 90-91.
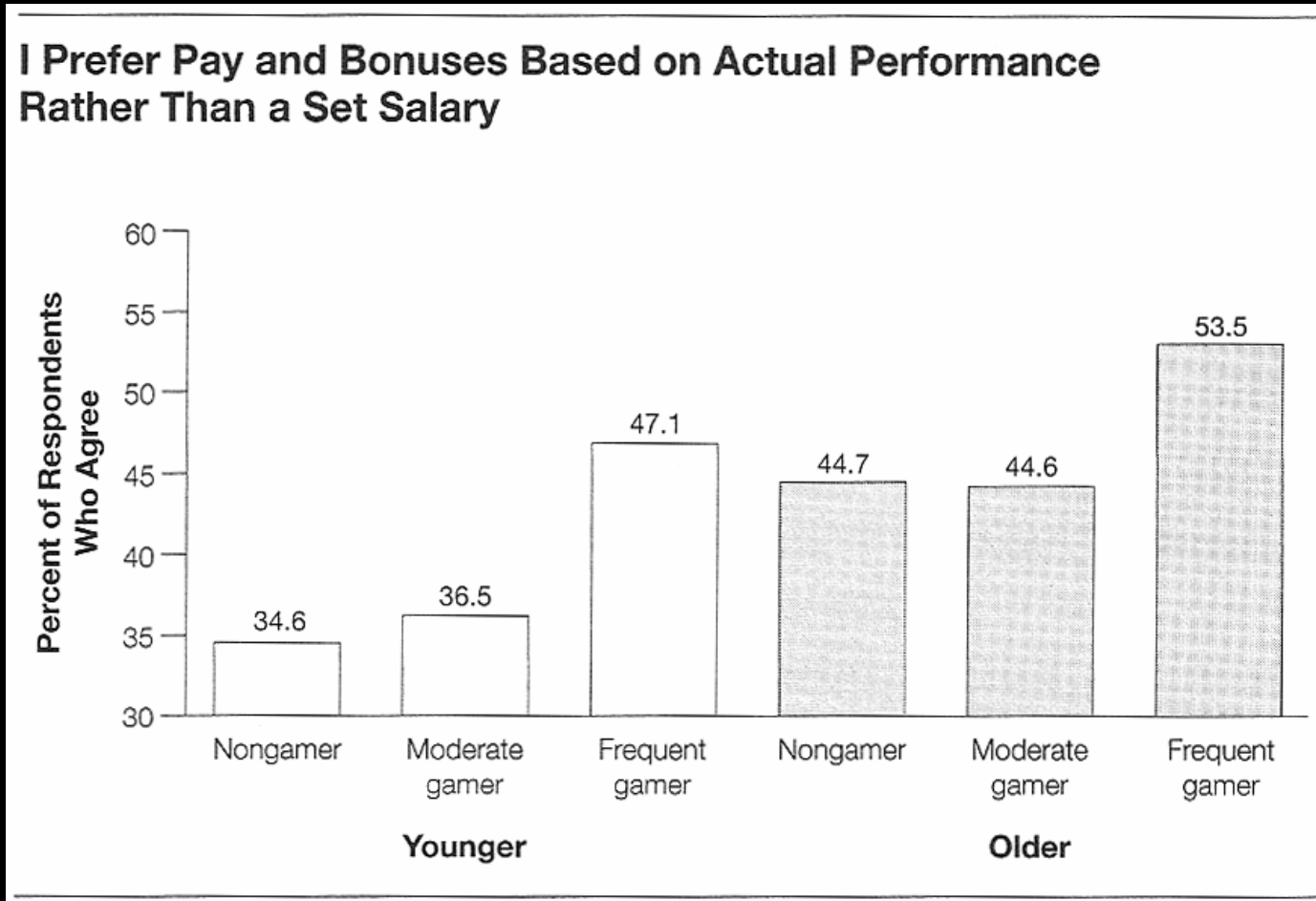
Beck & Wade Info

✓ John C. Beck and Mitchell Wade*

  ✓ 2,500 surveyed in corporate America

  ✓ How do gamers vs. non-gamers feel about work

  ✓ Game players, regardless of age, possess desired skills

Gamers Care About the Organization


I Really Care About the Fate of the Organization I Work For
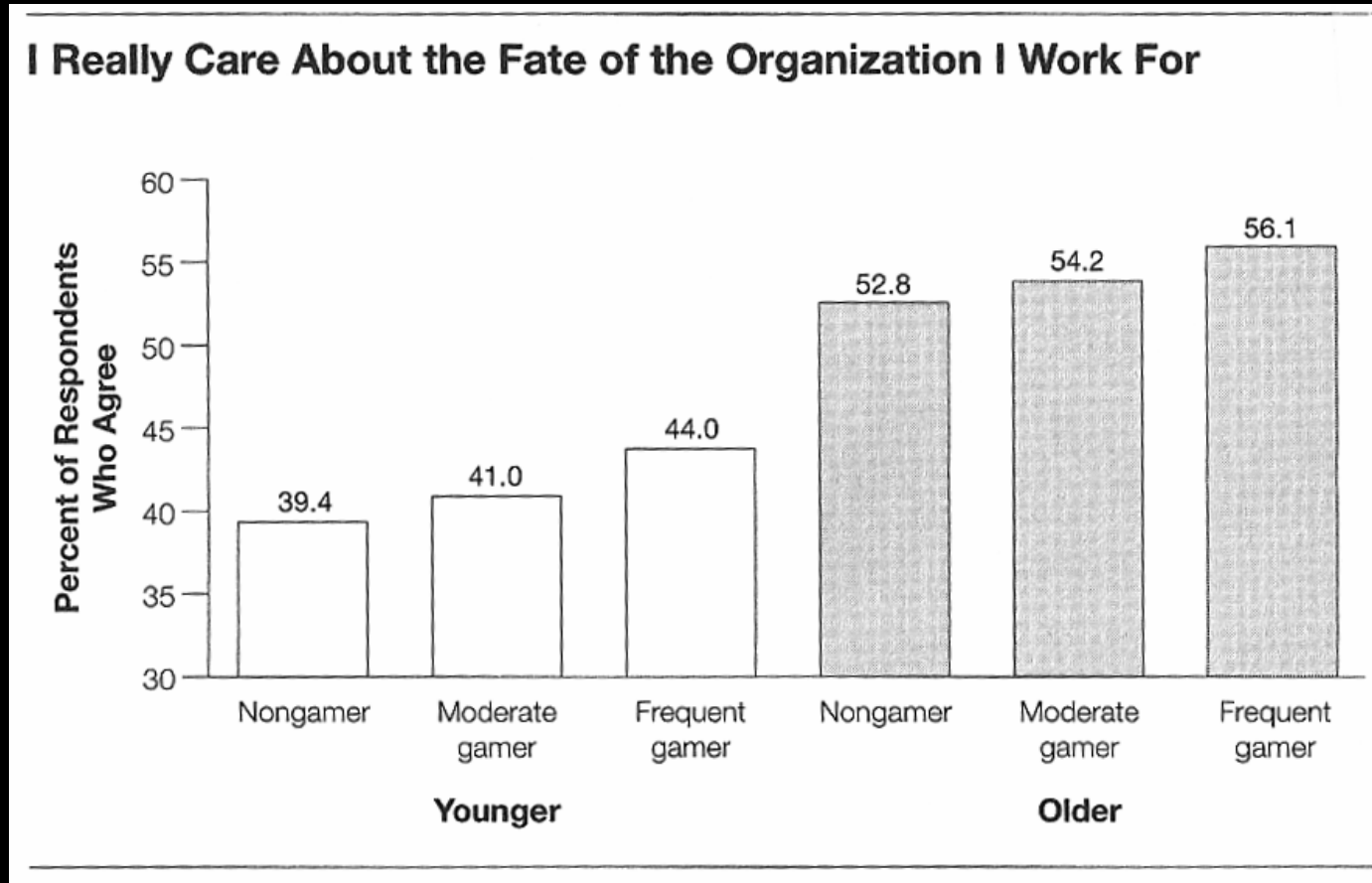
Gamers Believe Pay Should Be Earned
(and commensurate with effort)

I Prefer Pay and Bonuses Based on Actual Performance Rather Than a Set Salary

Gamers are Team Players

"When presented with the statement, 'I find people more stimulating than anything else'...Nongamers express the lowest average need for others' companionship at work...and those with frequent gaming experience... express this need most often."

The Best Way to Get Things Done Is to Connect with the Right People
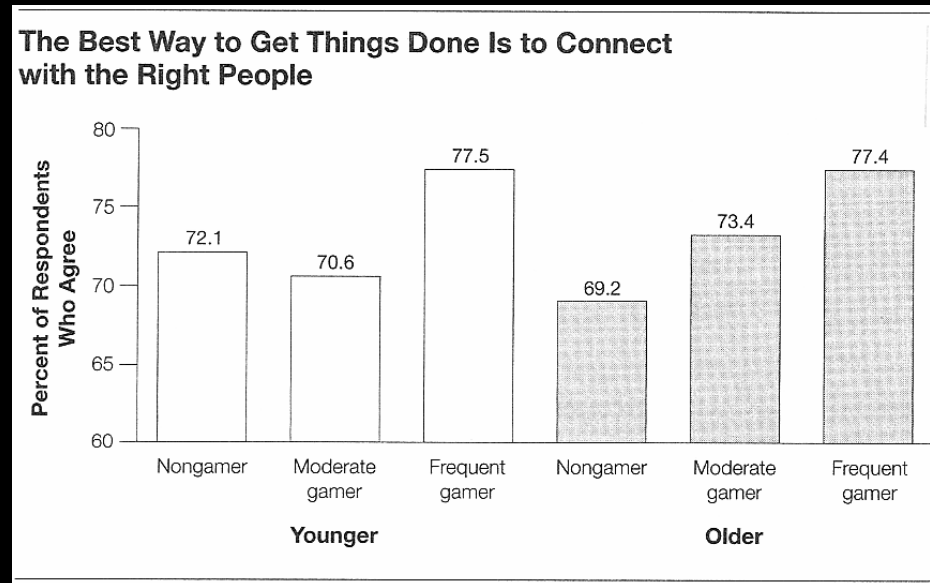
Gamers Live in an N Dimensional World

✓ "The tools we are comfortable with--linear models, printed spreadsheets, single point estimates, and rules of thumb-- simply can't guide us through the complex, volatile and sometimes unknowable factors that now drive many decisions, or should."

"[this generation is] already used to thinking in these ways-- really living in "dataspace"...Cutting edge analytic tools that look a lot more like video games than office suites have already helped...Using this technology is a purely digital, interactive experience. There IS no hard copy to fall back on..."

Growing Pains

✓ Impractical & dangerous to dismiss them

    ✓ 80 million Generation G

        ✓ Same number as boomers

    ✓ Will be 10 million more jobs than workers by 2010

        ✓ Industry & schools have no CHOICE but to find ways to channel Millennial strengths and adapt the work environment

    ✓ *"[we have to] understand the strengths that this odd "training program" has given them, and how to match those strengths to organizations, expectations, and people rooted in a very different world." (Beck & Wade, 2004)*

✓ What are the consequences of not making these changes?

How Is this Change Affecting Learning?

Which of the following is the current high school dropout rate?

5%

10%

15%

20%

30%

Numbers are worse for minorities

50% for Black, Hispanic, & Indian

How Is Change Affecting Learning?

Which of the following was the number ONE reason cited for dropping out?

Boredom

Had to get a job

Had to take care of family

Gangs

Unplanned pregnancy

Generation G Are Not Slackers

✓ Data comes from Gates Foundation Civic Enterprises study

- ✓ These were kids who had the grades to graduate
  - ✓ 90% had passing grades when they dropped out
  - ✓ 75% percent placed primary or only blame for dropout on themselves
  - ✓ 70% are confident they could have graduated if they had been more challenged and engaged

✓ Why aren't we reaching them?

- ✓ These are 2.0 learners
  - ✓ It's all about *interaction* & *engagement*
  - ✓ But schools and training are all about *passive reception*

Information & Learning for the 1.0 Generation

Old Learning, New Learning

The Future of Learning

✓ Abandon all hope, ye who enter here?

    ✓ Past DOES have a place in the future of learning

    ✓ Immersive learning environments employ sound learning theory

    ✓ Have to understand them to take advantage of them

✓ Learning 2.0 will be interactive, collaborative, shared, distributed, coauthored, and engaging

The Future of Learning

✓ Educause Review, January/February, 2007:

  ✓ Interaction is key for education, especially P2P and "asynchronous social networking repositories" [1]

   ✓ My Space, Facebook, You Tube are precursors

  ✓ Young people "will be competing and collaborating on a global scale"; open source and new technologies provide "the opportunity to rebuild the collaborative social structures that we have begun to lose in our communities." [2]

  ✓ "...the process of creating content may be more important to learning than the act of merely consuming it." [1]

  ✓ Where is the place in schools for this new literacy? Who will teach it? [3]

[1] Andrew J. Milne, CEO, *Tidebreak* Inc., (workspace technologies to improve performance) & visiting scholar at Stanford
[2] Matthew J. Szulik, CEO, Chairman, President, *Red Hat*
[3] John Weber, Dayton Director of the Frances Young Tang Teaching Museum & Art Gallery, and Board Member for New Media Consortium.

DGBL: Immersive Learning Environments

✓ Games are one example

✓ Games can help, but NOT because

    ✓ they are new ways of learning,
    ✓ they are fun,
    ✓ we have to entertain our students.

✓ Games CAN help because:

    ✓ they are interactive,
    ✓ they are engaging,
    ✓ they build in feedback and assessment,
    ✓ they encompass proven instructional strategies,
    ✓ they promote 21st century skills.

Principle One:
Play theory, cycles of learning, & engagement

✓ Play is naturally employed, effective learning paradigm
  - ✓ Crawford, 1982; Gee, 2004; Lepper & Chabay, 1985; Papert, 1998; Reiber, 1996)
  - ✓ Biological imperative

✓ Play requires interaction and participation
  - ✓ Can't be passive, constant cycle of action/reaction
  - ✓ Leads to engagement in game
  - ✓ Same principle as good learning

Principle Two:
Problem-Based Learning

✓ **Benefits of PBL**
- ✓ PS is highest level of learning (Gagne, 2005)
  - ✓ Vehicle for all intellectual skills AND promotes transfer (Delisle, 1997)
- ✓ Two critical attributes of any problem (Jonassen, 2002)
  - ✓ The unknown (goal requires generation of new knowledge)
  - ✓ A value to learner in solving the problem
- ✓ Requires short- and long-term goal setting
  - ✓ Positive correlation with learning
  - ✓ Improves self-efficacy, which is also correlated with learning (Bandura, 1997)

✓ **Games are problem solving**
- ✓ Have unknown & value; require short & long-term goals

Principle Three:
Situated Cognition & Learning

✓ Brown, Collins, & Duguid, 1989

  ✓ Congruence of learning & performance contexts

  ✓ Relevance and "anchoring" of knowledge in authentic contexts

  ✓ Improves learning (Anderson, 1995; Bower, 1981 & 1987); Clark, Milberg, & Ross, 1983; Smith, Glenberg, & Bjork, 1978)

✓ All learning in games is situated

  ✓ Goal (unknown) drives everything

  ✓ Everything learned is relevant and applied

Questioning, Cognitive Disequilibrium, Scaffolding

- ✓ Question asking
  - ✓ Improves learning (e.g., Graesser & Person, 1994; Otero & Graesser, 2001; Graesser et al., 1999)
  - ✓ Games, as PBL, promote question-asking
- ✓ Cognitive Disequilibrium (Piaget)
  - ✓ Problem solving and question-asking triggered by CD
  - ✓ Games thrive on cycles of CD & resolution (= engagement)
- ✓ Vygotsky's "Zone of Proximal Development"
  - ✓ Players want to be challenged, want only minimal hints, NOT the answer
  - ✓ Games keep players in the ZPD

"Everything I ever really needed to know...

✓ ...I learned from playing games"*

    ✓ Games teach me how to solve problems

    ✓ Games teach me how to work with others and lead

    ✓ Games help me be organized and detail-oriented

    ✓ Games let me create things and tell stories

* Not really, but they DO teach these things!

Problem Solving

Gabriel Knight 2

Teamwork, Leadership, Community

EverQuest II

QuickTime™ and a
PNG Video decompressor
are needed to see this picture.

Teamwork, Leadership, Community

✓ Work with others

✓ Partition attention, divide tasks

✓ Coordinate efforts

✓ Communicate via variety of technologies and media

✓ Shared goals

Organization, Multi-tasking, Detail-Oriented

Organization, Multi-tasking, Detail-Oriented

✓ Attend to multiple channels

    ✓ audio-visual input & feedback

    ✓ Spoken text

    ✓ Written text

    ✓ Graphic information displays

✓ Integrate information to make decisions

✓ Prioritize incoming data according to goals

✓ How many channels in typical classroom or workplace?

Creative Producers & Communicators

Halo & Red vs. Blue...

Creative Producers & Communicators

✓ Machinima (muh-shee-nee-muh)

  ✓ *Neverwinter Nights*, *Halo, Second Life*

✓ Media-rich communicators

  ✓ Text does not compute

    ✓ Communicate on multiple channels, seamlessly

  ✓ Media generators and storytellers

    ✓ Substitute for/enhance reports

    ✓ Project kick-off meetings

✓ Interactive problem solvers

  ✓ Interact/collaborate online and in person

Old Games, New Games

Everything That Rises, Must Converge...

- ✓ Social networking, games, virtual presence, collaboration, collective intelligence...
  - ✓ Not abstractions, but reality
- ✓ BusinessWeek story lines & quotes:
  - ✓ VR goes mainstream
    - ✓ Home computer applications coming
  - ✓ Getty Images buys Scoopt
    - ✓ News footage generated by populace on cell phones, etc.
  - ✓ Mobile Broadcasting
    - ✓ NBC signs deal with MobiTV to send TV to cell phones
  - ✓ Twitter.com
    - ✓ Instant info
    - ✓ 80,000 subcribers/contributors second-by-second blogging

Business Week, April 2, 2007

That Was Then, This is the Tomorrow

✓ Old Input, New Input

    ✓ Joy sticks & mice...

    ✓ ...versus haptic control

That Was Then, This is the Tomorrow

✓ Old input, New input

   ✓ Console controllers...

   ✓ ...versus Wii controllers

That Was Then, This is the Tomorrow

✓ Old system/New system

    ✓ Faster computer games & better graphics...
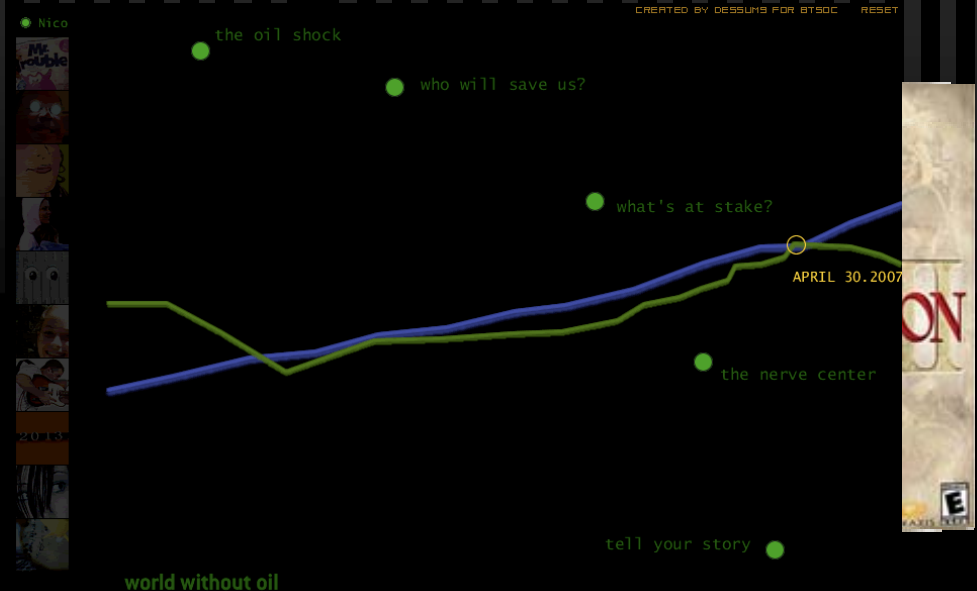
    ✓ ...versus immersive interaction

The Next Generation Now

Xbox 360™ is all about a new generation of extreme fun. Get in on the best games, the most powerful system, a worldwide community, and much more.

Learn More >>>

That Was Then, This is the Future

✓ Old games/New games

    ✓ Computer games...

    ✓ ...versus alternate reality games

✓   (social networking, information technology, and games)

I Love Bees   World Without Oil

HALT - MODULE CORE HEMORRHAGE

Control has been yielded to the
SYSTEM PERIL DISTRIBUTED REFLEX.

grope:
seeker > lattach Princess
fall "msg: SPDR-5.14.3

evade evade evade

!probe extern proc 1
rogue proc

!bite rogue proc 1 recurse
clean !splotch confidence 100

Mission Log   **MIA**   **Recruits**

COUNTDOWN TO WIDE AWAKE AND PHYSICAL:
199286:20:10:37:231

Make your decisions accordingly.

CREATED BY DESSUMS FOR BTSOC — RESET

the oil shock

who will save us?

what's at stake?

APRIL 30.2007

the nerve center

tell your story

world without oil

Alternate Reality Games

✓ Games that take place in "real" world

✓ Promote "collective intelligence"

    ✓ Pierre Levy, 1994

    ✓ "We think, therefore we are"

✓ 3 key aspects: collective cognition, cooperation, and coordination

✓ An example: I Love Bees

    ✓ Backstory cross tie to Halo

    ✓ Halo ship crashes on Earth, AI damaged, takes over a website to try to summon others

How it Worked

✓ Container filled with honey & letters sent to previous

   ✓ Unscrambled showed "i love bees"

   ✓ ilovebees.com

      ✓ Supposed beekeeper's website

      ✓ Screen and messages from owner showed had been hacked

      ✓ No guidance beyond hacked data (40,000 GPS; countdown timer)

✓ Collective cognition

   ✓ Blogs, ListServs, and phone conferences spontaneously created

   ✓ One email post led to 2,358 lines of reply

   ✓ 33,000 lines of daily chat

   ✓ 50 new posts every second

   ✓ 1,000,000 message board chats

How it Worked

✓ Cooperation
- ✓ 4,000 online (the beekeepers)
- ✓ Split GPS analysis into three schools of thought
  - ✓ literal, relative, numerical/mathematical
- ✓ Formed 3 groups and boards
  - ✓ After several weeks, converged on literal meaning (pay phones)

✓ Coordination
- ✓ 60% of game content pre-specified
- ✓ Tracked theories and ideas; incorporated into game design

✓ Result
- ✓ Made 40,000 phone calls on specified day
- ✓ Players had to use codes and phrases from game to convince AI were ally

✓ World Without Oil begin April 30

The Future is Now

- ✓ Life 2.0 will be
  - ✓ Immersive
  - ✓ Social
  - ✓ Negotiated
  - ✓ Collaborative
  - ✓ Virtual & augmented reality
- ✓ Already training the next generation
- ✓ Our role?
  - ✓ Lead, follow, or get out of the way

Thank You!

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