

# Preparing Young Americans for Life & Work in Revolutionary Times

presented by

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## “WHAT WORK REQUIRES OF SCHOOLS” 1991

Secretary’s Commission on Achieving Necessary Skills (SCANS)

- **Basic skills** – reads, writes, performs arithmetic and mathematical operations, listens and speaks.
- **Thinking skills** – is creative, makes decisions, solves problems, visualizes, knows how to learn and reasons coherently.
- **Personal qualities** – is responsible, possesses self-esteem and displays sociability, self management, integrity and honesty.
- **Competency at:**
  - organizing, planning for and allocating resources
  - working with others
  - acquiring and using information
  - understanding complex systemic inter-relationships
  - working with a variety of technologies

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## “TOUGH CHOICES OR TOUGH TIMES” 2006

Commission on the Skills of the American Workforce (CSAW)

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Acknowledging the failure of U.S. schools to meet SCANS performance goals, the Commission recommended revamping public education to:

- incorporate 2 years of college into K-12 curriculum;
- establish State hiring agencies to recruit new teachers from the top one-third of college students;
- increase teacher pay range to \$45,000 to \$110,000 to attract high quality faculty;
- fund increased pay by reducing drop-outs and remedial education through higher quality teaching (and absorbing community colleges).
- provide all 18-year olds with associate degrees in 10 years, while preparing at least 60% of all grads for baccalaureate programs.

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## REALITY CHECK !

U.S. Bureau of Labor Statistics (BLS)

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- Today, only 29% of all U.S. jobs require a post-secondary degree or formal certification.
- Current BLS employment projections indicate that only 31% of all U.S. jobs will require a post-secondary degree or certification in 10 years, while over 2/3 of all new jobs will only involve on-the-job training, and require no post-secondary certification whatsoever!

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## Never forget . . .

. . . the widely-held belief that our future will involve a rising tide of technology-driven prosperity which “lifts all boats” is an *article of faith*, based on historical analogy; it is NOT a *rigorously forecastable probability!*

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## 3 STAGES OF TECHNOLOGIC DEVELOPMENT

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1<sup>st</sup> 25 YEARS – Introduction (or “Infancy”)

**The technology is economically non-productive.**

2<sup>nd</sup> 25 YEARS – Development (or “Adolescence”)

**The technology is economically counter-productive.**

3<sup>rd</sup> 25 YEARS – Assimilation (or “Maturity”)

**The technology is economically hyper-productive.**

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### 3 STAGES OF THE COMPUTER'S DEVELOPMENT

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1<sup>st</sup> 25 YEARS – economically **non-productive**.

**FOR THE COMPUTER – 1946 to 1971**

2<sup>nd</sup> 25 YEARS – economically **counter-productive**.

**FOR THE COMPUTER – 1971 to 1996**

3<sup>rd</sup> 25 YEARS – economically **hyper-productive**.

**FOR THE COMPUTER – 1996 to 2020**

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### SIGNS OF TECHNO-ECONOMIC CHANGE

#### AVERAGE ANNUAL U.S. PRODUCTIVITY IMPROVEMENT RATES

1974 – 1994	1995 – 1999	2000 – 2005
1.4%	2.5%	3.1%

#### AVERAGE ANNUAL INFLATION RATES

	1990 – 1994	1995 – 1999	2000 – 2005
U.S.	3.6%	2.4%	2.1%
WORLD	30.4%	8.4%	3.9%

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## INFRASTRUCTURE LEVERAGES INVENTION

<u>Technology (Invented)</u>	<u>Infrastructure (Begun)</u>
<b>Steam Engine (1776)</b>	<b>Railway Network (1825)</b>
<b>Electric Dynamo (1871)</b>	<b>Power Grid (1908)</b>
<b>Computer (1946)</b>	<b>World Wide Web (1994)</b>

The addition of color, graphics, sound and data transmission in 1994 transformed the Internet text-messaging system into the World Wide Web, the infrastructure – or **Info-Structure** – for the computer, and **THE crucial enabler of the information economy.**

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Economic historians report that when  
a new technology finally reaches maturity,

.....  
( **50 to 75 years AFTER** it was invented )  
.....

it becomes hyper-productive by **transforming**  
**how all work is done!** That's why they call it a  
**“REVOLUTION.”**

Historic models suggest that for the COMPUTER  
**the Revolution will take place between**  
**1995 and 2020.**

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Information technology is going to  
**TRANSFORM** HOW ALL WORK IS DONE ?

**Just what does that MEAN?**

### Thomas Friedman's

#### "10 FORCES THAT FLATTENED THE WORLD"\*

1. 11/9/89 • Berlin Wall falls
2. Early 1990's • Web/Netscape
3. Mid-1990's • Work Flow Software
4. Late 1990s • Open Sourcing
5. Late 1990s • Outsourcing
6. 2000 • Y2K/off-shoring
7. 2000 • Supply-chaining
8. 2000 • Insourcing
9. 2001 → In-forming
10. 2001 → "The Steroids"  
(Wireless ubiquity)

\*from *The World Is Flat*, Release 1.0

## FLATTENING

takes many forms – all made possible by the Internet – only a few of which actually involve international trade or globalization:

- Info-mation/Disintermediation
- Outsourcing/Insourcing/Supply-chaining
  - Importing/Off-shoring
- Home-basing/Self-employment

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**FLATTER IS MORE PRODUCTIVE !**

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## “Doing more work with less labor”

### COMPARATIVE 10-YEAR PROJECTIONS FOR U.S. POPULATION AND JOB GROWTH

(2000 to 2010 – 2002 to 2012 – 2004 to 2014)

Projected Years	Projected Population Growth		Projected Job Growth		Job Creation Rate
	Numbers	%	Numbers	%	
2000 to 2010	28.1 million	10%	22.2 million	15.2%	100:79
2002 to 2012	28.8 million	10%	21.3 million	14.8%	100:74
2004 to 2014	29.4 million	10%	18.9 million	13.0%	100:64

SOURCE: U.S. Bureau of Labor Statistics (BLS)

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**And that's not all . . . .**

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## VANISHING MIDDLE INCOME JOBS

*“Rapidly-growing Service Sector employment requires higher average skills, but pays lower average wages and benefits than do our shrinking capital-intensive manufacturing and primary industries.”*

Economic Policy Institute, 2005

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**This all begins to sound pretty**

**GLOOMY!**

**WHAT ABOUT THE “HIGH-TECH BOOM” ?**

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# THE BUST BEFORE THE BOOM

Historically, rising tides of technology-based productivity improvement that “lift all boats” have been preceded by what economist Joseph Schumpeter once described as:

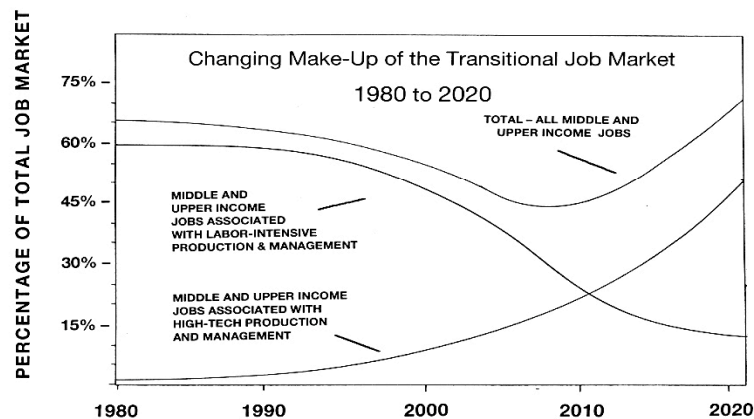
**“a wave of creative destruction!”**

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**“a wave of creative destruction. . .”**

Joseph Schumpeter  
*Business Cycles -1939*



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**So . . .**

**we're not quite half-way through the  
INFORMATION REVOLUTION!\***

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\*Politicians never use the “**R**” word, to avoid upsetting the electorate. Because of this, many (most?) people do not fully appreciate the scale and permanence of the changes that are happening all around them.

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**An awkward moment in time . .**

History reassures us that our newly-mature technology will eventually enable millions of ordinary employees to add more value in the workplace.

**BUT,**

**THIS HAS NOT YET BEGUN TO HAPPEN,**

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**AND THE HIGH TECH BOOM IS STILL**

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**ONLY AN ARTICLE OF FAITH.**

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**At this uncertain moment, it is reasonable for society to ask:**

Since the basic purpose of education is to prepare young people for the future,

“For what sort of future should our schools be preparing today’s students?”

“In particular, what kinds of skills will they need?”

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**At this uncertain moment, it is reasonable for society to ask:**

“For what sort of future should our schools be preparing today’s students?”

“In particular, what kinds of skills will they need?”

**THAT DEPENDS ON WHO YOU ASK!**

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## THE GREAT SKILLS DEBATE - I

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### **CEOs, macro-economists and politicians say:**

- America must double its science, technology, math and engineering graduates in 10 years to remain competitive in a globalizing economy.
- In 10 years, 95% of ALL jobs in our “high tech” workplace will require a post-secondary degree.  
(Commission on the Skills of American Workforce - 2006)
- Many U.S. K-12 and post-secondary graduates do not possess adequate basic workplace skills to qualify for today’s middle-income jobs.

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## THE GREAT SKILLS DEBATE - II

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### **Labor demographers, pollsters and most teachers say:**

- Tests routinely show that the great majority of U.S. K-12 and post-secondary graduates possess the basic cognitive skills required by employers – and they’re getting better (slowly).
- Current BLS 10-year workforce forecasts reflect no significant increases in jobs requiring post-secondary degrees.
- Cross-sectional surveys indicate that employers are much less concerned about cognitive skills deficits than they are about poor work habits and demeanor, lack of motivation and bad attitudes of entry-level workers.

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## THE GREAT SKILLS DEBATE - III

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**Think tanks, workplace research and futurists say:**

In addition to basic cognitive skills, ALL post-industrial jobs will require NEW interactive & analytical skills:

### INTERACTIVE

- Cybernautics
- Collegiality/Teamwork
- Self-directed learning

### ANALYTICAL

- Systemic thinking
- Statistical literacy
- Spatial/graphic literacy

**for which there are no common standards of curriculum content or student assessment!**

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## SCHOOLS ARE GETTING MIXED MARCHING ORDERS

**CEOs/Polis say:** “COLLEGE PREP FOR ALL!”

**Teachers say:** “THE DATA SHOW WE’RE GETTING BETTER,  
SO JUST GET OFF OUR BACKS AND  
LET US TEACH!”

**Employers say:** GIVE US “TRACTABLE, TRAINABLE  
WETWARE” WITH GOOD CHARACTER!

**Futurists say:** “ADD NEW BASIC SKILLS FOR EVERYBODY!”

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## **SCHOOLS ARE GETTING MIXED MARCHING ORDERS**

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WETWARE” WITH GOOD CHARACTER!
- Futurists say:** “ADD NEW BASIC SKILLS FOR EVERYBODY!”
- NCLB says:** “BY THE NUMBERS, *TEACH, 2, 3, 4!*”

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**Faced with  
multiple conflicting agendas,  
*what should educators do?***

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When **ChAoS** threatens,  
it is generally a good idea  
to go back to first principles.

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**If information technology is going to  
TRANSFORM HOW ALL WORK IS DONE,  
educators must prepare students  
for that transformational future.**

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## TRANSFORMING WORK IN AMERICA (How it's being done.)



Already under way, this involves both:

- **NEW WORKPLACE RULES**
- **NEW WORKPLACE TOOLS**

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## NEW WORKPLACE RULES

“In the new economy, **THE NETWORK**  
of suppliers, producers and  
customers will be the business.”

Grady Means & David Schneider  
*MetaCapitalism*  
2000

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In *The World Is Flat*,  
Thomas Friedman refers to this as the

## **HORIZONTALIZATION**

of enterprise, which involves more lateral movement of information and resources among institutions and individuals, and a replacement of old vertical “command and control” management systems with flat “connect and collaborate” systems.

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## **NEW WORKPLACE TOOLS: “GROUPWARE” FOR CONNECTING AND COLLABORATING**

- PEER-TO-PEER FILE SHARING (P2P) – off-the-shelf info-structure for teamwork on-line.
- INSTANT MESSAGING (IM) will surpass use of e-mail in business by 2010.
- WEB LOGS (Blogs) – a powerful new medium for advertising, teaching/learning, news reporting and market research.
- REALLY SIMPLE SYNDICATION (RSS) – serial self-publishing made easy.
- WIKIS (Wikis) – “let a thousand collaborations bloom” “learning locally sharing globally,” *Wikinomics*.

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## “COMMUNITIES OF PRACTICE” - I

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Most employees maintain a “community of practice,” an informal personal network of peers – present and former co-workers, supervisors, teachers, class-mates, family members, etc. – whom they call on to validate and augment their personal workplace knowledge and judgment.

**Individual employee’s communities of practice are crucial to all organizations’ abilities to master changing realities and to deal effectively with innovation on the job.**

Etienne Wenger

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## “COMMUNITIES OF PRACTICE” - II

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“Organizations that manage themselves as networks of multiple *communities of practice* will devote more discipline, resources and incentives to achieving superior performance than will the command-and-control hierarchies they supplant.”

Dr. Jim Botkin  
*Smart Business: How Knowledge Communities  
Can Revolutionize Your Business*  
Free Press, 2002

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## GOOD BUSINESS & GOOD SOCCER TEAMS

“Business is a lot like soccer. In soccer, there are some set plays, but the best teams also display a wealth of effective improvisation, based on the players’ deep knowledge of one another. We can get a lot more out of people if we tap into them as new sources of innovation and productivity. **And now we’re getting the right kind of technology tools to permit this kind of *spontaneous collaboration*.”**

John Seely Brown  
address to the  
Information Work Productivity Council  
February 1, 2004

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**Many large firms – like IBM, Mittal and Schlumberger – have already set up in-house employee collaboration networks on their intranets.**

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**From now on**, the principles and practices of “connect & collaborate” will be required of all managers and encouraged among all workers, not only because of the

## HORIZONTALIZATION

of enterprise, but also because . . . .

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## **WE HAVE NOW ENTERED A TIME OF CONTINUOUS INNOVATION AND CHANGE**

In a world of rapidly-expanding knowledge, ongoing innovation and globalization, EVERYONE must be attuned to anticipating, detecting and responding to the consequences of change, since . . .

**“Innovation and change occur in a world so complex that the unexpected must always be expected.”**

Edward Tenner’s “Law of Unintended Consequences”

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## **Command and control systems,**

based on long-term experience and well-established expertise work well in times of low innovation and incremental change.

But in times of rapid innovation and change, command and control systems become overwhelmed, internally conflicted and ineffective.

Futurist Joel Barker calls this:

**“PARADIGM PARALYSIS!”**

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## In Revolutionary times,

organizations whose workers are empowered and equipped to connect and collaborate will be better able to manage **both** intentional change **and** *its unintended consequences*.

In fact, as change becomes continuous, those who master niche applications of collegial collaboration will form the basis of a new info-preneurial middle class.

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## PROFESSIONAL AGENTS OF CHANGE FOR *Revolutionary* TIMES

Rapid innovation and change have already given rise to a marketplace demand for new kinds of *facilitative occupations* that *The World Is Flat* identifies as a major new source of middle income jobs:

- Synthesizers
- Explainers
- Leveragers
- Adapters
- Personalizers
- Localizers
- Collaborators/Orchestrators

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### Tom Friedman's "New Middlers"

- Synthesizers
- Leveragers
- Personalizers
- Collaborators/Orchestrators
- Explainers
- Adapters
- Localizers

The marketplace commonly refers to such individuals as "consultants," currently the fastest growing category of middle-income jobs in the U.S.

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## SPONTANEOUS COLLABORATION AND THE INEVITABLE SURPRISES

Collaborative peer networks will also be essential if we are to effectively manage the **WILD CARDS** that we will be dealt.

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## “Wild Card” events in our future . . . .

HYPER-WEATHER

PANDEMICS

PEAK OIL ↗

CURE FOR ALZHEIMERS

TERRORISM!

CYBERTAGE!

A nation of spontaneous collaborators  
will be much better able to act quickly  
and constructively in response to the  
**BIG SURPRISES** we know lie ahead!

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## AMERICA'S CHOICE: COLLEGE GRADS

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To support our future high-tech economy, make *all* K-12 college prep, and send *all* students on to post-secondary schooling. . . .

• • • or “VERSATILISTS”\*

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To cope with continuous change, all K-12 graduates must be web-competent, understand the systemic nature of all things, value knowledge over assumptions when making decisions, and be collegial in their work habits.

\*What IT consultant Gartner, Inc. calls the generically skilled workers now increasingly in demand.

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**CLEARLY, ANY EFFORTS  
BY OUR CURRENT K-12 APPARATUS\***

to develop and deliver **either** a college prep curriculum **or** a versatelist curriculum would take too long, cost too much, and ultimately fail, **especially under the influence of NCLB!**

\*teacher-mediated/ classroom-based instruction (a 4,500 year-old social technology) organized into politicized bureaucracies (another 4,500 year-old social technology).

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***Of course,***

*there is no reason to believe that education – alone among all of our major institutions – will be untouched by the forces of flattening and the productive power of connect and collaborate networks.*

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## Suppose ...

### THE NEW WORKPLACE RULES APPLIED TO SCHOOLS

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“In the new pedagogy, THE NETWORK of instructional materials producers, faculty, and students/graduates/employers will be the school.”

*Means & Schneider (2000), paraphrased*

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## and suppose there were ...

### NEW WORKPLACE TOOLS FOR SCHOOLS

(In addition to P2P, I•M, Blogs, RSS and Wikis.)

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#### SIX NEW USES OF INFO-COM TECHNOLOGY WITH TRANSFORMATIONAL POTENTIAL FOR K-12 \*

- User-created content
- Web-enabled cell phones
- New forms of scholarship and publication
- Social networking
- Virtual worlds(simulations)
- Massively multiplayer on-line gaming

\*2007 Horizon Report - New Media Consortium - [www.nmc.org/horizon](http://www.nmc.org/horizon)

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## CONVERGING DEVELOPMENTS - I

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- November, 2005 – McKinsey & Co. concludes that fostering peer collaboration is the most effective way to increase the productivity of employees whose jobs cannot be automated. (LIKE NURSES & TEACHERS!)
- October, 2006 – The Federation of American Scientists finds that “computer games teach skills that employers want: analytical thinking, team building, multi-tasking and problem-solving *under duress*,” and concludes that:

“Electronic games can redefine education!”

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## CONVERGING DEVELOPMENTS - II

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- June, 2007 – Education Sector (a Washington think tank) reports that the nation’s virtual high schools and their 700,000 students have evolved into “laboratories of reform in the forefront of successful eLearning innovation, and blending “brick” and “click” schooling.”
- July, 2007 – The U.S. House of Representatives declares “computer modeling and simulation” a National Critical Technology.

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## **“Reforming” America’s Schools (1983-2007)**

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- The most widely held goals for the future of education in America – commonly voiced by politicians, business leaders and teachers alike – have always reflected a vision of *the present system made perfect*.
- From *A Nation At Risk*, to *No Child Left Behind*, the objective of school “reform” in America has been to “improve” education, not to change it.
- These multiple efforts to improve our schools have had little measurable impact on overall student achievement.

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## **Sustaining America’s Schools (2007 - ?)**

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- Faced with inflating costs, a projected 1 million teacher shortage (2017) and rapidly evolving curricular demands, the nation can no longer afford to put all of its educational eggs in one brick basket.
- Although ½ of all U.S. households still have no broadband access, and ¼ of households have no access to a computer, teachers must no longer be restricted to in-school use of *edWare*. They must be free to blend virtual schooling, eLearning and simulations with their classroom instruction

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## **“BRICKS” & “CLICKS” IN K-12 EDUCATION**

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- A growing array of enterprises – retailers, banks, health care providers, higher ed, etc. – are finding that an on-line presence (in “click space”) enhances the performance of the parent institution (“brick space”).
- Corporate trainers report superior results from “blended” e Learning, compared to pure classroom and pure on-line learning alternatives.
- The demonstrated effectiveness of mentored eLearning merits schools investing in low-cost computers and WiFi/WiMax networks to secure broadband access for all student homes.

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## **CYBER-ACTIVE TEACHERS AS REVOLUTIONARIES**

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- Between 5% and 10% of America’s 3.4 million K-12 teachers are professionally engaged on the Internet: in peer practice groups, as ed-ware developers/ testers, as co-teachers and as on-line learners.
- If given the freedom to use innovative eLearning, thousands of cyber-active teachers – especially the “digital natives” – will quickly introduce students across the country to the educational power of groupware, modeling, simulations and games.

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## CHANGING SCHOOLS FOR CHANGING TIMES

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- TEACHERS = Edu-preneurs
- CLICK SCHOOLING = R & D
- CLASSROOMS = The Nexus of change
- BRICK SCHOOLS = Infra/Info-structure, ,  
quality control, community relations
- COMMUNITY MEMBERS = Adjunct faculty

**And teachers call the plays!**

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## “Let a thousand flowers BLOOM!”

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- The foregoing scenario would accelerate innovation in America’s schools.
- The dynamics of “viral marketing’ would speed the adoption of successful innovations nationwide.
- Such a scenario would be too chaotic for any school authority to sanction.

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**It's a REVOLUTION,  
for Pete's sake!  
Things are supposed to get  
cHAtIc!**

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**. . . and,  
without a REVOLUTION,  
America's schools will not  
make the leap to cyberspace;  
neither will millions of students!**

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**WELCOME  
TO  
REVOLUTIONARY TIMES!**

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*“The future evolves in an orderly fashion,  
out of the realities of the past,  
filtered and shaped by the decisions  
of the present.”*

David Pearce Snyder, 1969

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