



*40* YEARS

**FIRST**

INNOVATION  
*in* EDUCATION

# HEP PROJECT DIRECTORS' MEETING

MARCH 26-28, 2013 ■ WASHINGTON, D.C.

## FIPSE -40 Years of Innovation

*Will FIPSE Lead the Next (R)Evolution*

*Jack M Wilson*

*President Emeritus, The University of Massachusetts*

*Chair, FIPSE Advisory Board*

# FIPSE -40 Years of Innovation:

## Will FIPSE lead the next (R)Evolution:

-Everyone wants universities to change,  
but exactly how is not so clear

Jack M. Wilson, Ph.D.

President-Emeritus, University of Massachusetts

Distinguished Professor

March 26, 2013



University of Massachusetts

Amherst • Boston • Dartmouth • Lowell • Worcester • UMassOnline

# The Paradox

- At the same time that Universities are facing extraordinary financial pressures due to a collapse of state revenue and endowments
- Everyone is looking to Universities to lead us out of the economic decline
- Creating futures for students and communities
- And solving social challenges like
  - improving college readiness
  - Reducing disparities (racial, economic, gender, etc)
  - Increasing graduation rates
  - Attracting students into STEM fields
  - Better matching workforce needs

# President Obama's Goal

- To be first the world by 2020 in the proportion of college graduates.
  - ▣ -Address to Congress on Feb. 24, 2009.
- The US was tied for 6<sup>th</sup> place at 30% according to 2006 data.



# The Catalyst for the Future

- What do Boston, Bombay, Beijing, Bangalore have in common with
- San Francisco, Austin, Raleigh, Cambridge, and other world economic leaders?
- They are vibrant economic regions nucleated by world class universities.
- The President is right: we must do better!

# The Secret Sauce?



- Universities pouring out highly educated graduates with skills and intellectual property.
- World class research that is curing illnesses and creating new jobs, companies, and even entirely new industries.
- And doing this at very large scale.

# The Path



- The path to economic and social development in the world goes through our world class universities.



# But all is not well!

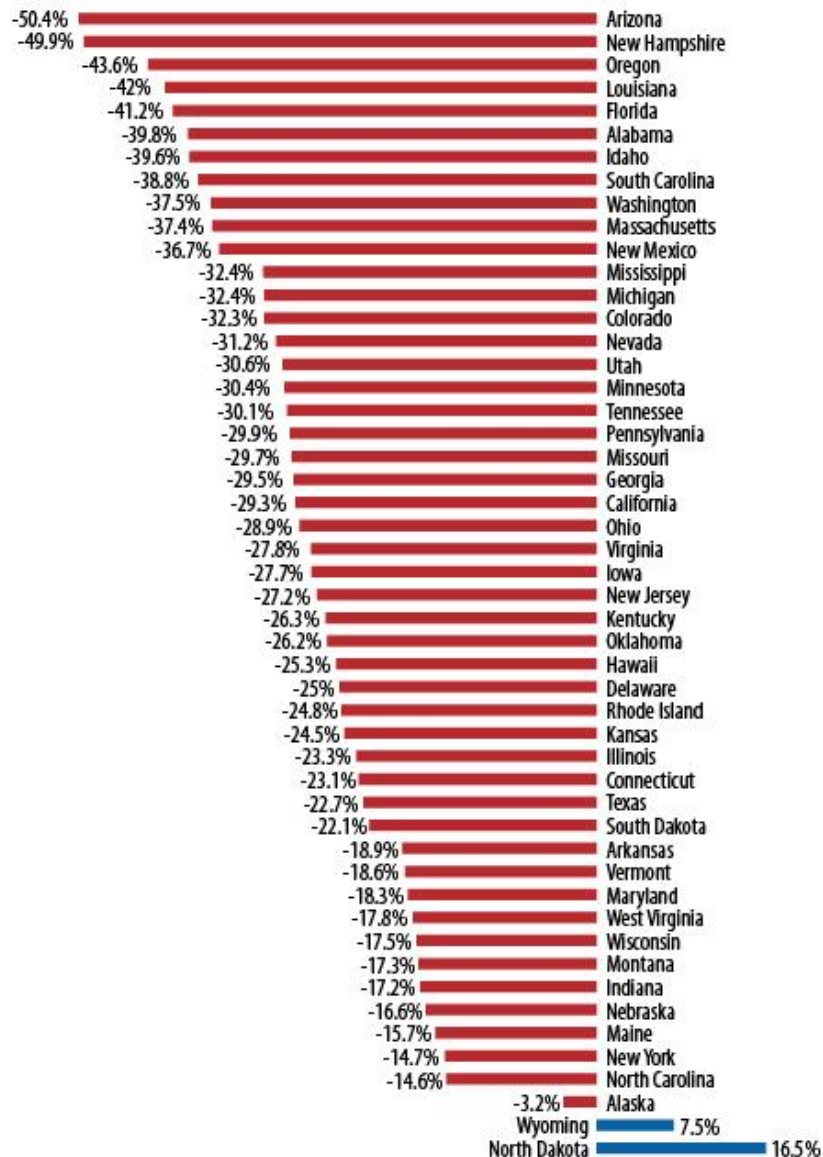
- Many think that Higher Education **costs** too much
- Higher Education has not yet taken full advantage of the research into how students learn –**cognitive** sciences.
- Higher Education reflects **disparities** in access and quality
- While **technology** has certainly pervaded higher education, it has not as significantly changed it.

# Higher Education costs too much?

- This widely held political position is most notable for the lack of understanding of why this might be –if indeed it really is!
- Nonetheless- we should buckle our seatbelts for a ride to drive down the cost of higher education -and many of the “well meaning” efforts will be far more damaging than helpful.
  - Some will be downright foolish like government attempts in Florida and Texas to mandate \$10,000 bachelor’s degrees –based upon political rather than academic considerations.
- As state support for higher education has been withdrawn, it is partially replaced by financial burdens on students.
  - *“Our public higher education institutions have faced the dual challenge in recent years of falling state appropriations and large increases in student enrollment,”* APLU President Peter McPherson
  - *“These factors have caused a substantial increase in tuition, even though public schools have kept their education cost per student to an average of just 1.2 percent above the rate of inflation for many years,”*

# States Have Cut Higher Education Funding Deeply in Recent Years

Percent change in state spending per student, inflation adjusted, FY08 - FY13



- Median Cuts were 27.7%
- Press reports like to focus on two numbers for effect:
  - ▣ The high posted price of privates
    - Which are often deeply discounted
  - ▣ The large percentage increases of publics
    - Which are applied to much lower costs and driven by state cuts.
    - Actual cost increases are only 1.2% over many years.

Source: CBPP calculations using data from Illinois State University's annual Grapevine Report. Illinois data is provided by the Fiscal Policy Center at Voices for Illinois Children. Because enrollment data is only available through the 2012 school year, the enrollment data for 2013 used in these calculations is estimated based on enrollment trends from past years.

# The 3 C's - the forces on education -\*

- **Computers**
- **Communication**
- **Cognition**
- Many of the innovations that catch the eye of the public do a good job on the first two and a lousy job on the third.
- We know much more about how students learn, and learning environments need to change to create the engagement that leads to student learning.
- That is indeed happening at many places  
The NCAT, NRC Report, White House Conferences

\* "Using the Computer in Teaching Physics," J.M. Wilson, *Physics Today* 42(1) (January 1989).

# Cognition

- My involvement with the recent NRC report reminded (and saddened) me to note that educational innovation often reinvents the wheel rather than advancing our understanding –based upon the research on the way students learn.
- There are notable exceptions like:
  - ▣ The National Center for Academic Transformation
  - ▣ The Rensselaer Studio Courses
  - ▣ Carnegie Mellon Open Learning Initiative (OLI).
  - ▣ Many others but not enough.

# TheNCAT –A brief mention

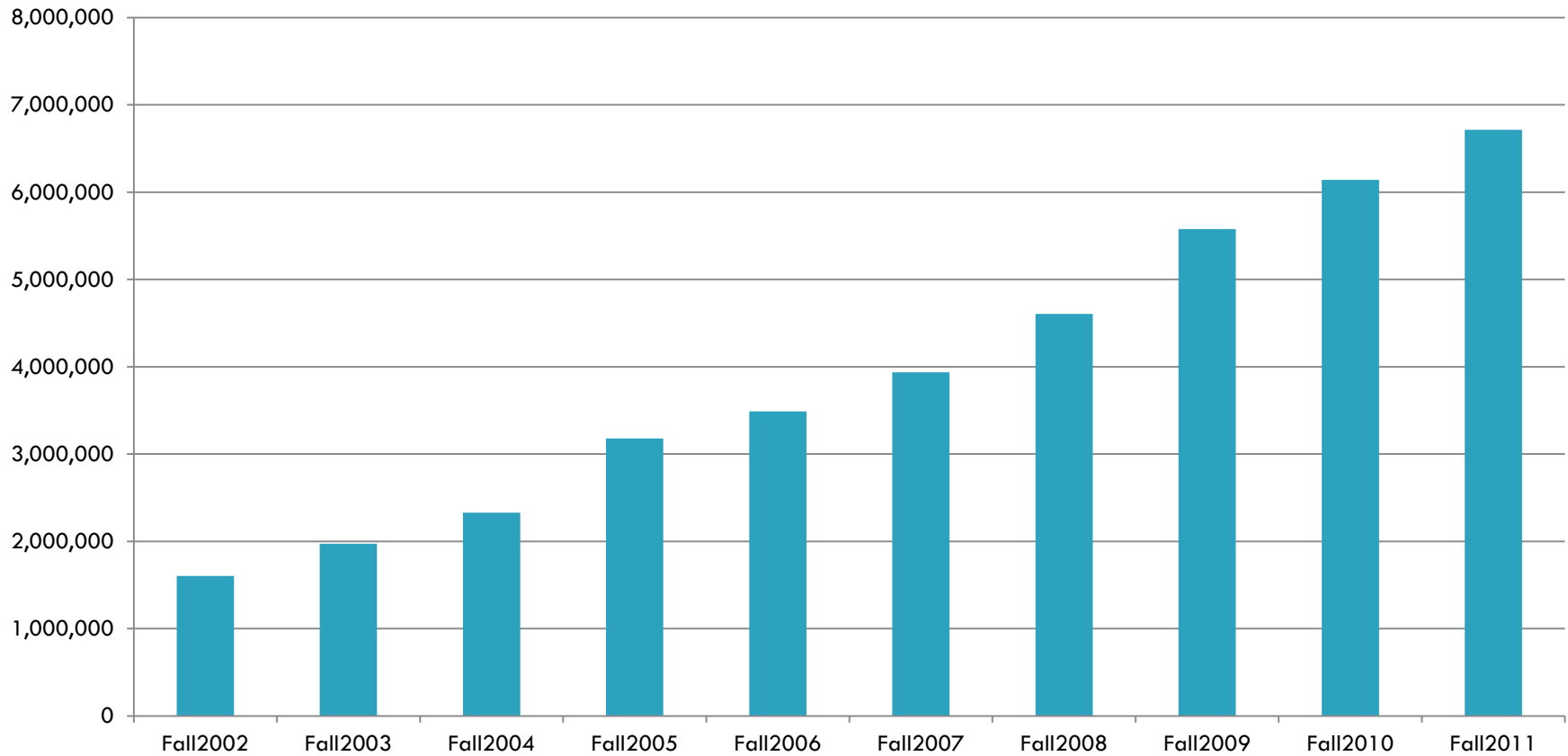
- Whenever anyone suggests that you cannot simultaneously enhance **quality**, **access**, and **cost** in traditional universities, I always ask them to look at the website of the National Center for Academic Transformation.
- Conventional wisdom is that universities do not change, but many do –and many are documented here.
- It is particularly notable because many of these reforms were driven by research in the cognitive sciences and make student engagement paramount.

# The Reality of Online Education transcends

- If one reads the traditional press coverage of online education it is dominated by either
  - ▣ Skepticism
    - Can students learn?
    - Cheating
    - etc
  - ▣ Hype
    - MOOCs will change the world and make higher education obsolete
    - The hyper prestigious universities drive the change
- **Not!**
- So what is the reality and the future?

# Relentless growth nationally

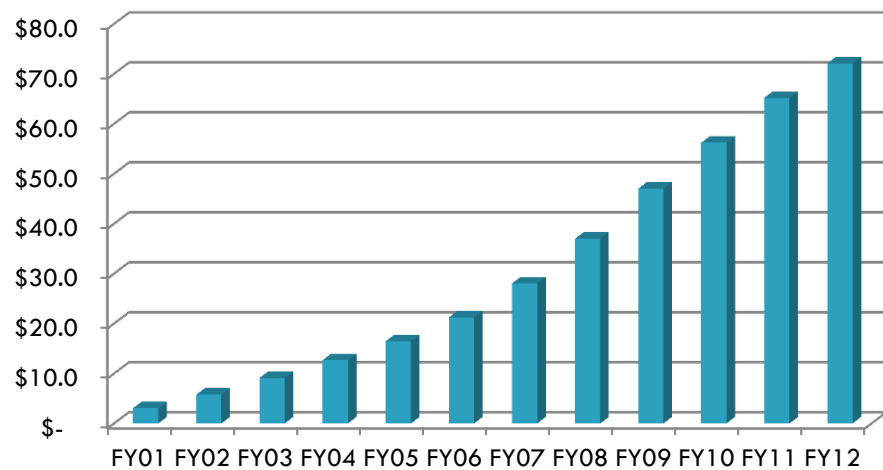
**Sloan Alt C- US Growth in Online**



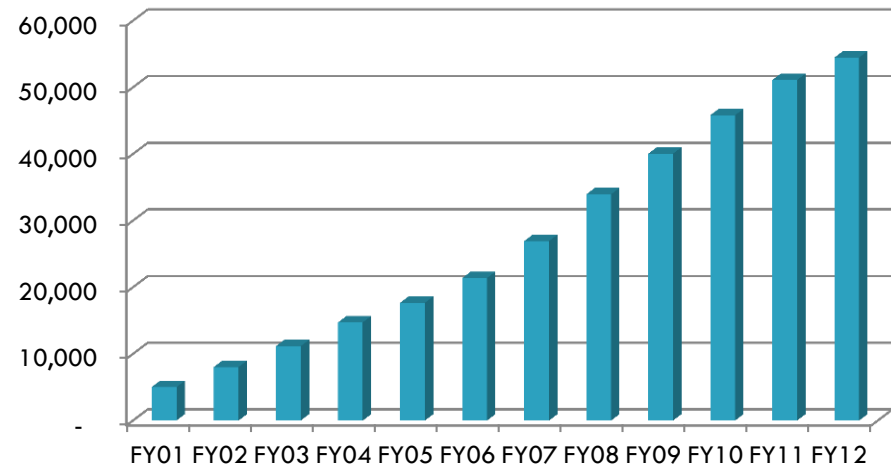


# UMassOnline Growth 2001-2012

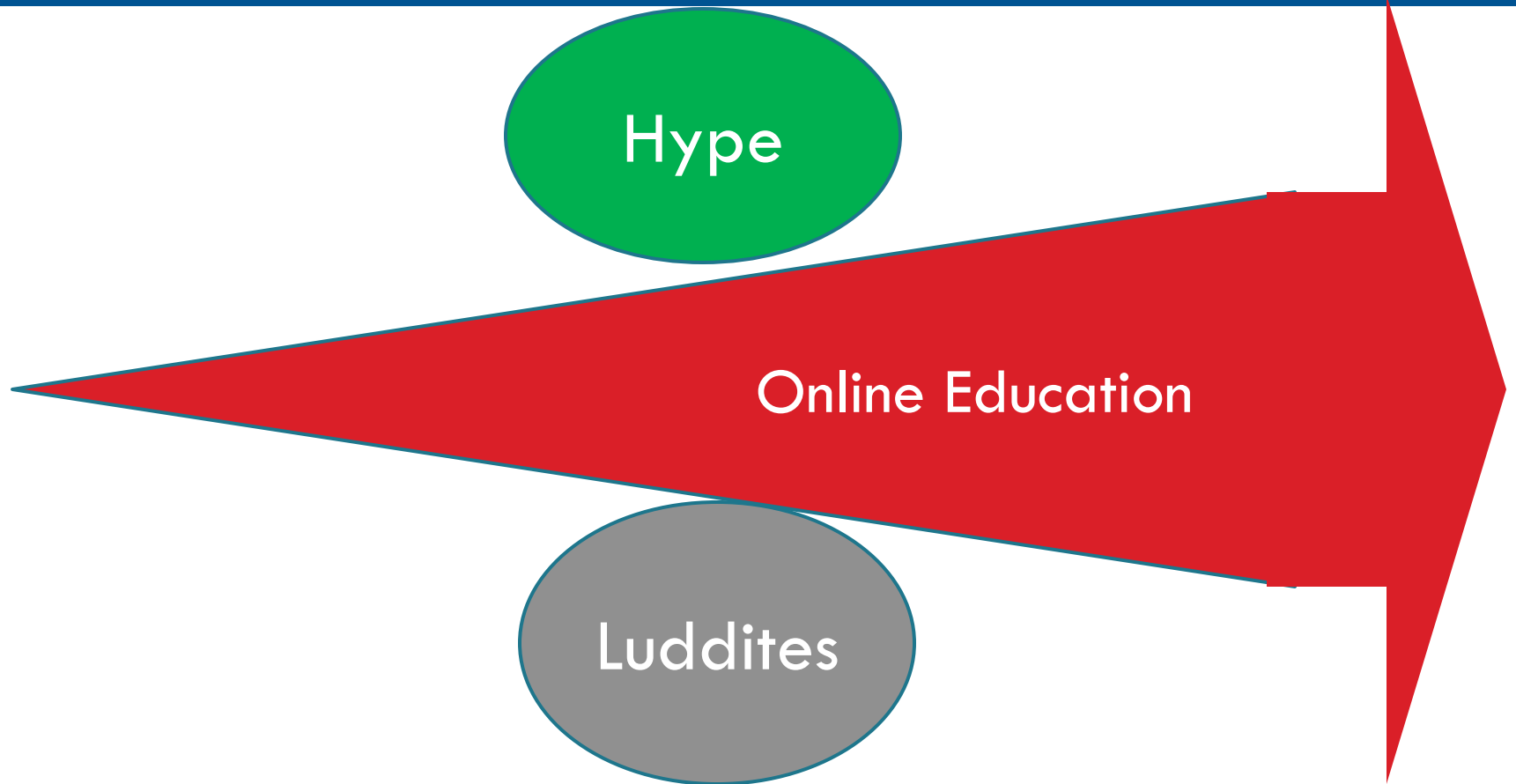
## Revenue (\$ Millions)



## Enrollment



# A Relentless Force that Will **Not** Be Denied



# But far too many are in denial

- While change has actually been rather large scale, the conventional wisdom is that there has been little change.
- It is also probably accurate to say that even the large scale changes have not penetrated the culture of higher education nearly as much as necessary.
- There is no shortage of contrarian voices that decry even those changes that HAVE occurred.
- The disparity is creating a vacuum into which politics is inevitably drawn.

# Are MOOCs going to change the world

- Too late. The world already changed without MOOCs even if Stanford, Harvard, MIT and others had not noticed!
- “the vast majority of people who sign up for MOOC’s don’t complete their courses, yet MOOC creators are hailed as visionaries rather than being denounced for their 10-percent completion rates” –Kevin Carey –Chronicle Blog
- MOOCs are interesting and valuable experiments, but they are not on the critical path of online education –at least in their current form.
- Online education is changing the world, and MOOCs can be a part of that.

# Massive Open Online Courses MOOCs

- Kahn Academy -2006
  - ▣ Salman Kahn –non-profit -2006
- Udacity -2012
  - ▣ Sebastian Thrun, Stanford - for-profit
- Coursera -2012
  - ▣ For-Profit – Andrew Ng, Daphne Koller, Stanford
- edX (MITx -2011 and edX in 2012)
  - ▣ Harvard, MIT, Berkeley –non-profit
- Udemy -2010
  - ▣ Eren Bali and Gagan Biyani –for profit

# The dangers of hype

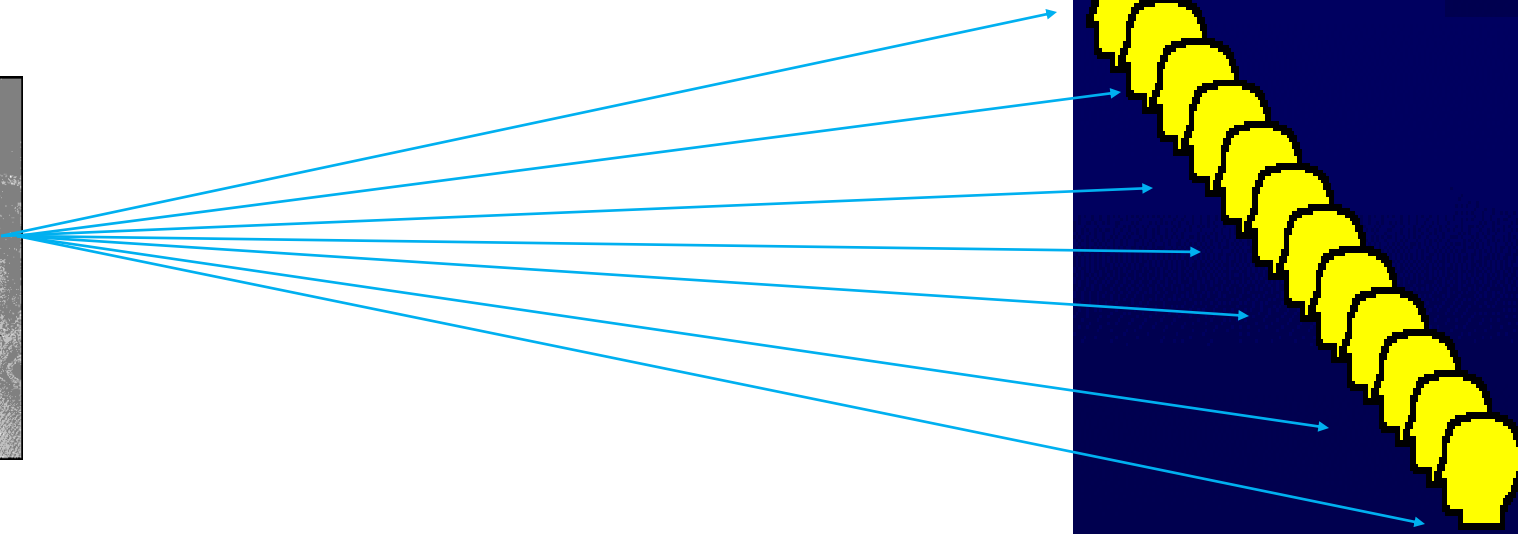
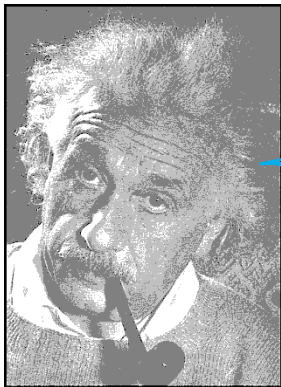
- Students get hurt by well meant, but poorly designed experiments.
- Money gets wasted at a time when every dollar is precious in higher education
- Good ideas get discredited by over-reaching and then failing.
- To anyone in the audience that I offend, I offer this prior apology but.....
- I hope that it encourages you to adopt a position of scientific skepticism and innovative optimism.

# A Brief History of “Distance Learning”

- Correspondence Courses
- TV Courses – Cable, Satellite, Videotape
- Interactive Video Courses (2-way satellite, videoconferencing, and now Skype)
- ALN – “traditional” online education
- MIT OpenCourseWare
- Carnegie Mellon Open Learning Initiative
- MOOCs
  
- Unfortunately many of the MOOCs look eerily like the “moving hand writes and then moves on” of the video days!

# The transmission (lecture) model

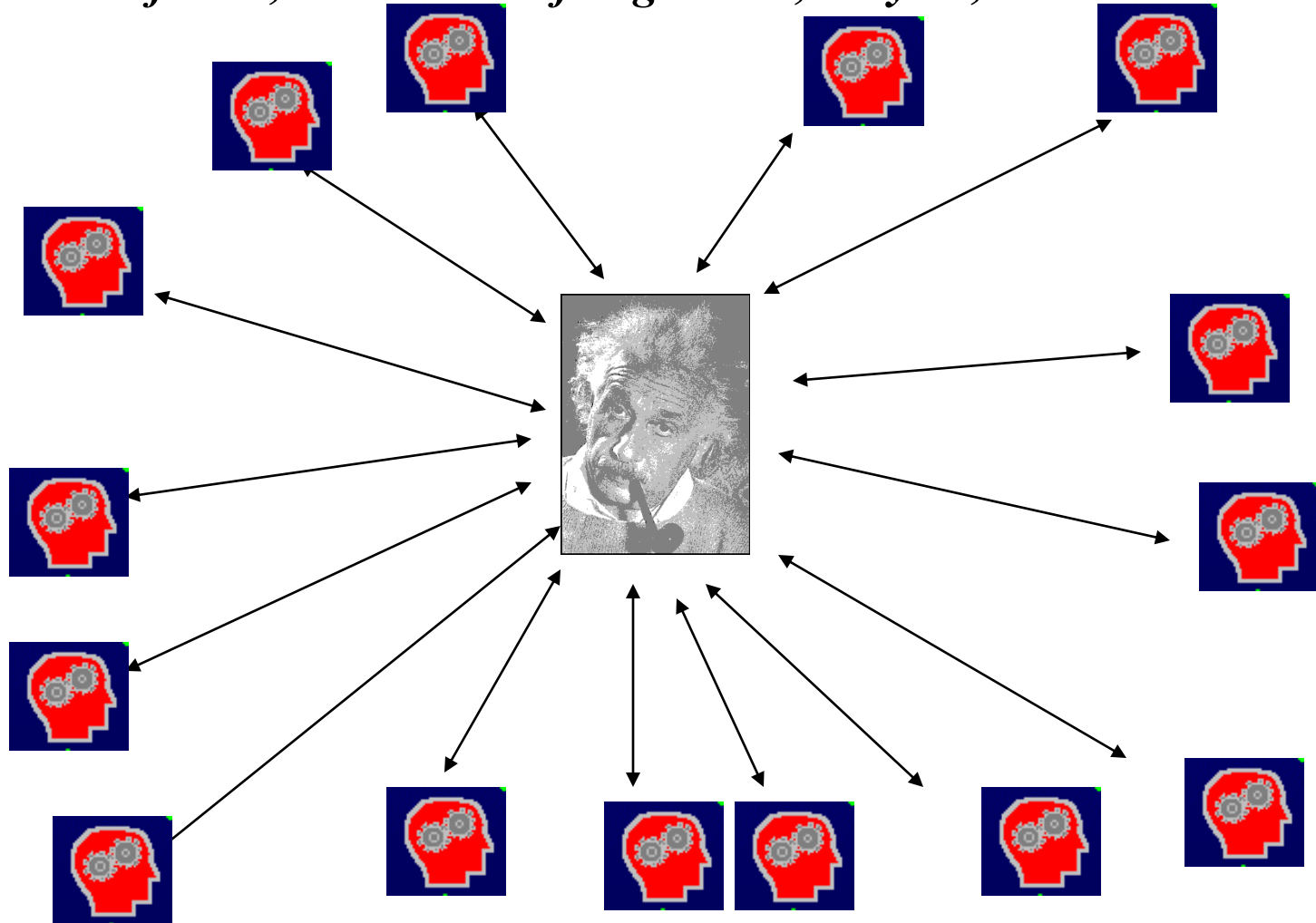
- The mainframe approach
  - ▣ Face to Face: The Lecture
  - ▣ Distance: TV (Cable, Video, Satellite, or MOOC)
    - Pushes the back wall out a few thousand miles





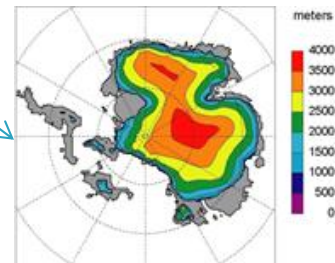
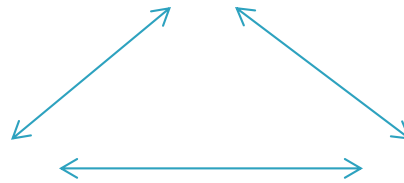
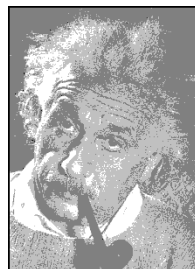
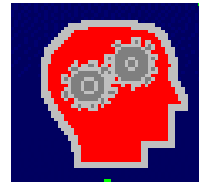
# Which can become the usual on-line course organization

*“The 24-Hour Professor;” Chronicle of Higher Ed; May 31, 2002*



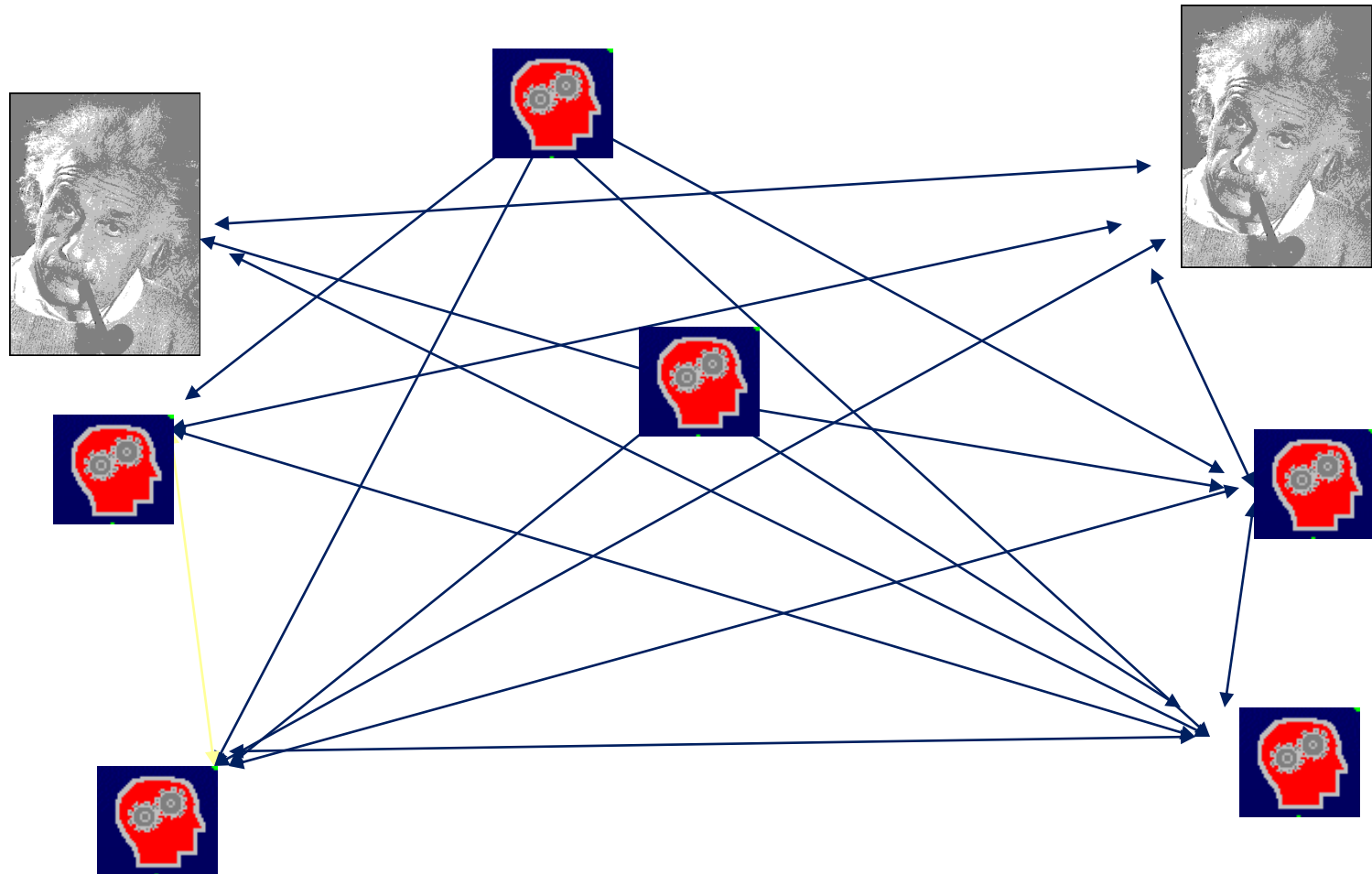
# Engagement

- Faculty with student (half done in lecture)
- Student with material (reading, homework, papers, adaptive tutorials, most MOOCs, etc)
- Student with Student (peer learning, small groups, team based projects, studio classrooms, etc)

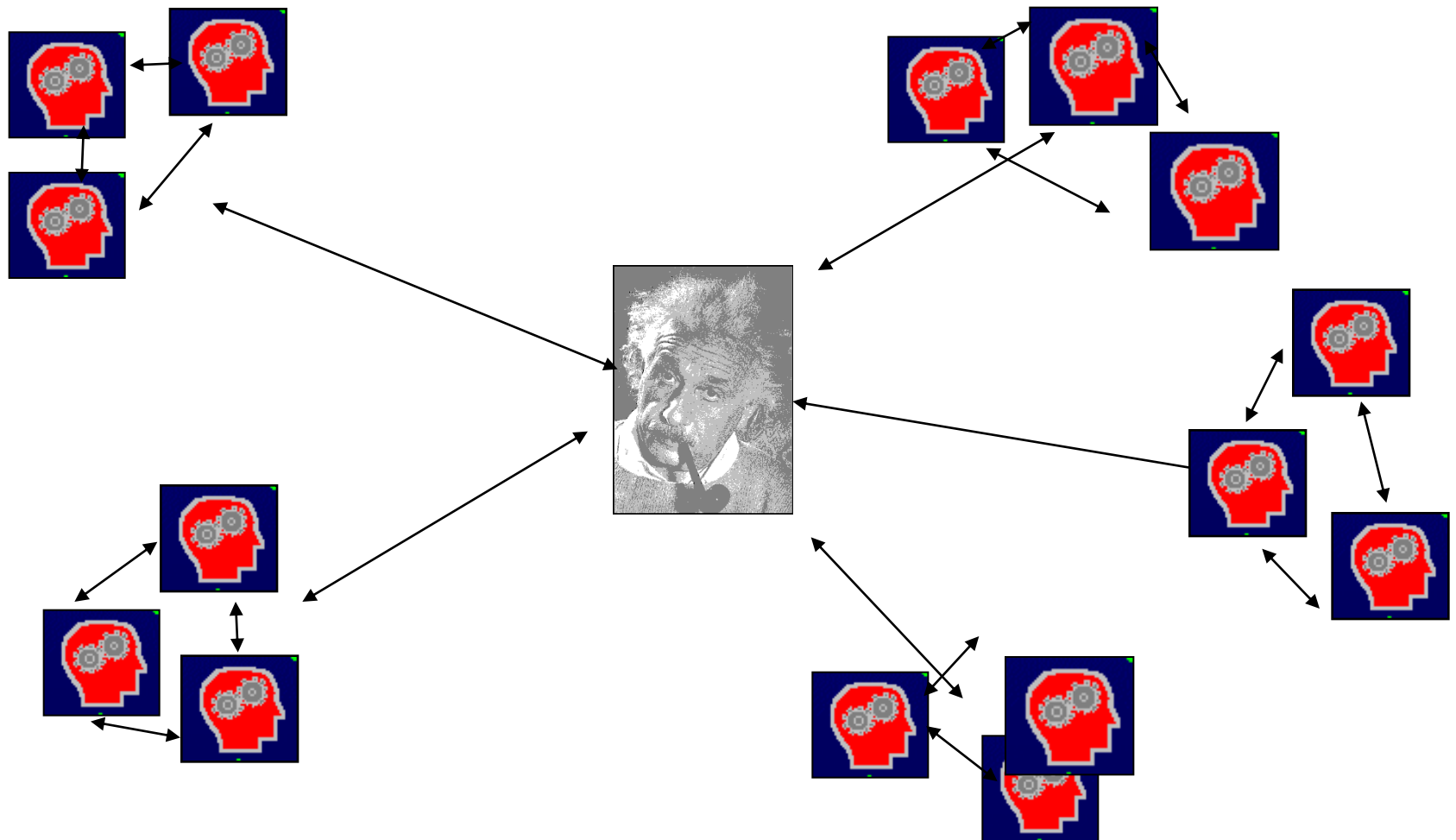


Climate change models, R. Decanto  
UMass/Amherst

# Distributed Collaborative On-line Model



# Collaborative Learning, Peer Learning.....



# Will FIPSE lead the way? (As it has in the past)

- Since its founding in 1973, FIPSE has often been at the forefront of many innovations and improvements in higher education.
- In recent years, funding from FIPSE has been largely directed toward specific and earmarked programs and the hallmark comprehensive program competition has been cancelled in five of the last seven years.
  - ▣ “FIPSE’s Freefall Continues” –Inside Higher Ed. (5/4/2010)
- President Obama has proposed a one billion dollar **Race to the Top** program for College Affordability and Completion, but it has not been funded by Congress.

# A personal look back

- I first became involved with FIPSE in 1982 administering a grant called TWIST (Training Women in Science and Technology) for the American Association of Physics Teachers. It was aimed at increasing women's participation in physics.
- FIPSE: Department of Education, 1985, \$502,842, **MUPPET** Project: Maryland University Project in Physics and Educational Technology, Co-Director (with E. F. Redish, Maryland).
- Let to the **CUPLE** project: **C**omprehensive **U**nified **P**hysics **L**earning **E**nvironment –which raised over a million \$ from NSF, IBM, and the Annenberg-CPB Project to create the first “**MOOC?**.”
  - ▣ Involved many in the national physics community and spun off countless other innovations still in use.
- This is only one (personal) example of countless ways FIPSE changed the world.

# Summary

- Universities have changed rather radically in many ways.
  - ▣ Meteoric rise of online learning
  - ▣ Involvement in economic development
  - ▣ Deployment of 2 of the 3 C's
  - ▣ Disinvestment by government
- FIPSE has been a catalyst for so much of the positive innovation.
- The future will continue to be quite a challenge for leaders of higher education.
- FIPSE's role is yet to be written.

# Happy Birthday FIPSE!

- Best Wishes for Many More!
  
- Thank You
  
- Jack M. Wilson
  - President Emeritus and Distinguished Professor of Higher Education, Emerging Technologies, and Innovation.
  - [www.jackmwilson.com](http://www.jackmwilson.com)