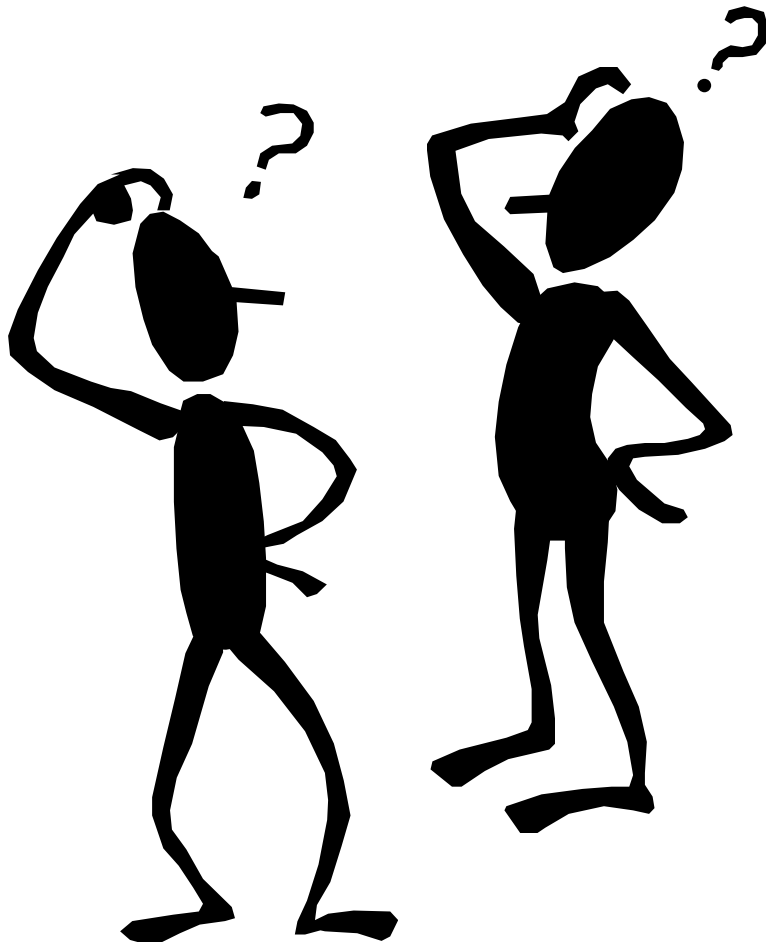
Raising and tending your flipped open hybrid virtual massive online course

Gerd Kortemeyer
Michigan State University

Halloween 2013



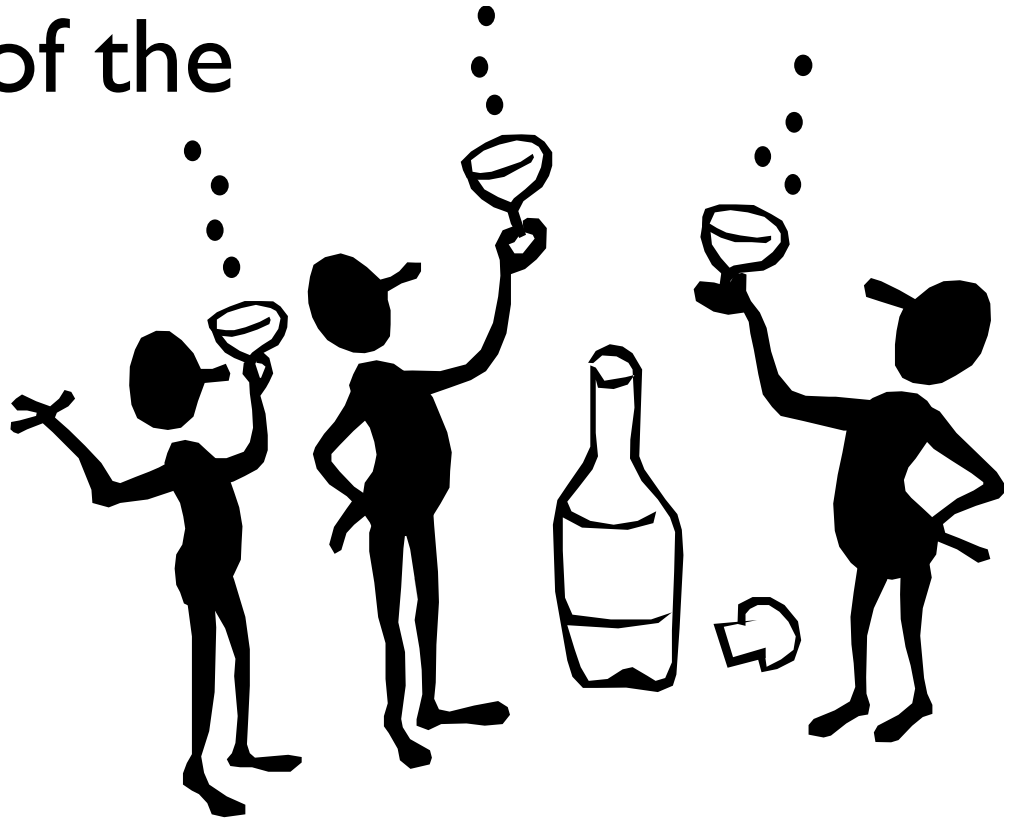
Perspektive

- Physics Education Researcher at Michigan State University
- Since 1999 Director of the LON-CAPA Project
- 2011/2012 Sabbatical at MIT

NEW!!! OERs and MOOCs

- OER: Open Educational Resources
- MOOC: Massive Open Online Course

„The Birth of the E-Learning Revolution“

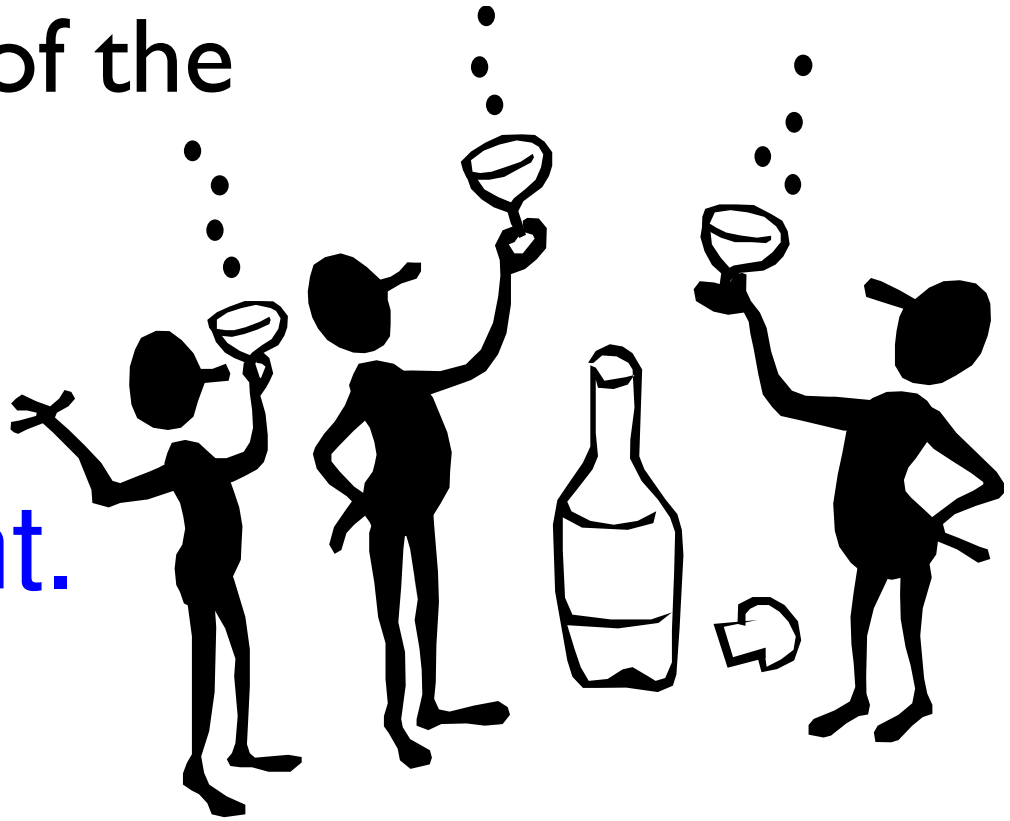


NEW!!! OERs and MOOCs

- OER: Open Educational Resources
- MOOC: Massive Open Online Course

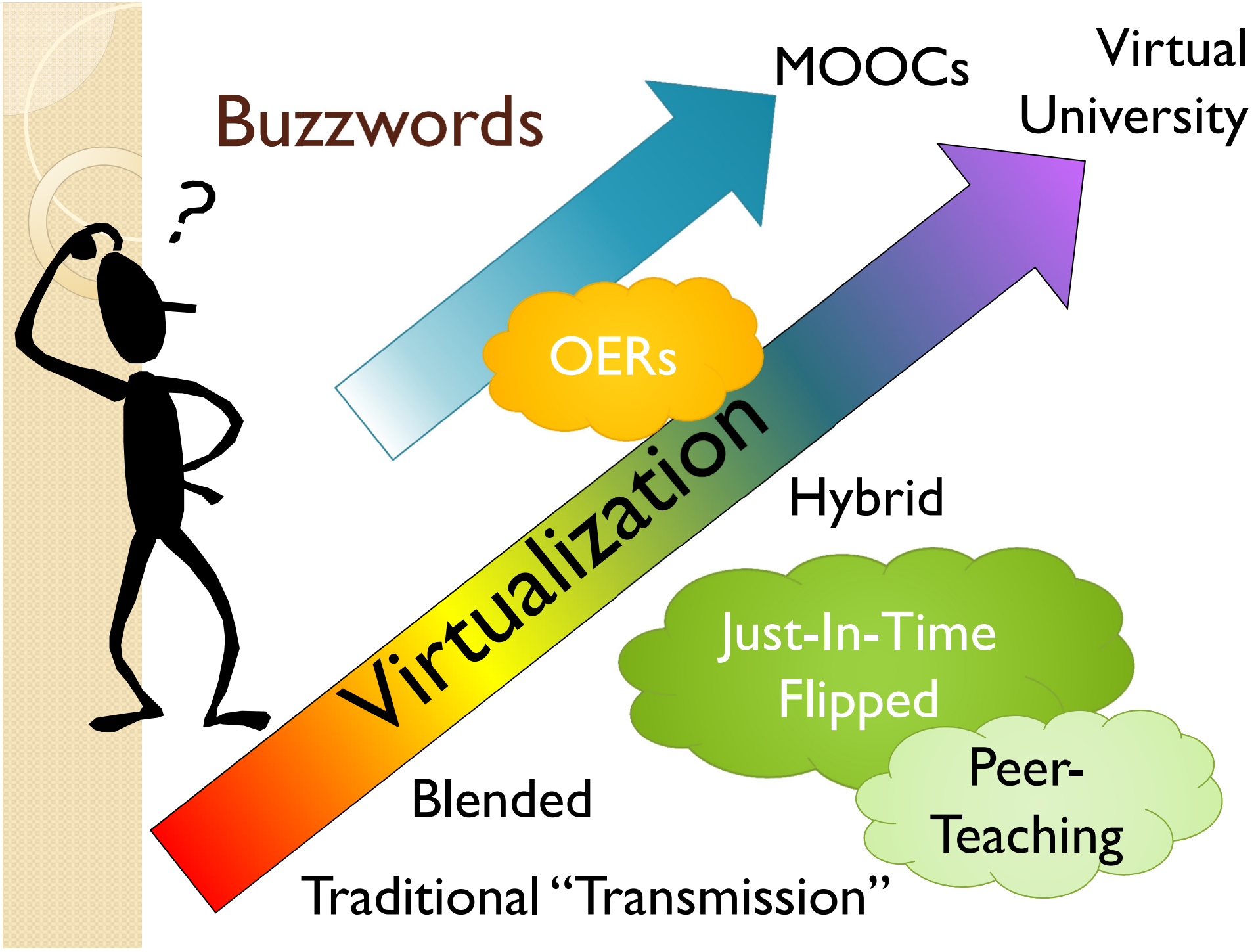
„The Birth of the E-Learning Revolution“

Yeah, right.



~~NEW!!!~~ OERs and MOOCs

- There is nothing new under the Sun
  - Been there, done that
- Or:
  - E-Learning: The first part of the tragedy
- Always fully buzzword-compliant!

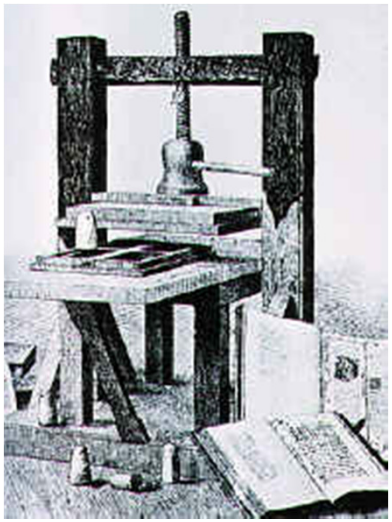

Buzzwords
?
MOOCs
Virtual University
OERs
Virtualization
Hybrid
Just-In-Time Flipped
Peer-Teaching
Blended
Traditional "Transmission"

Traditional Transmission

- 14th century
- Lecture
- We read books because students don't have any.

Traditional Transmission

- 15th century
- Book print with movable letters
- Books become affordable
  - (changing again today)
- We could use lectures for activities other than reading …
  - … but we usually don't



Traditional Transmission

- 20th century
- Students in the USA are required to buy books
  - different from other nations
- Great! Now students and instructors can read from the same text!

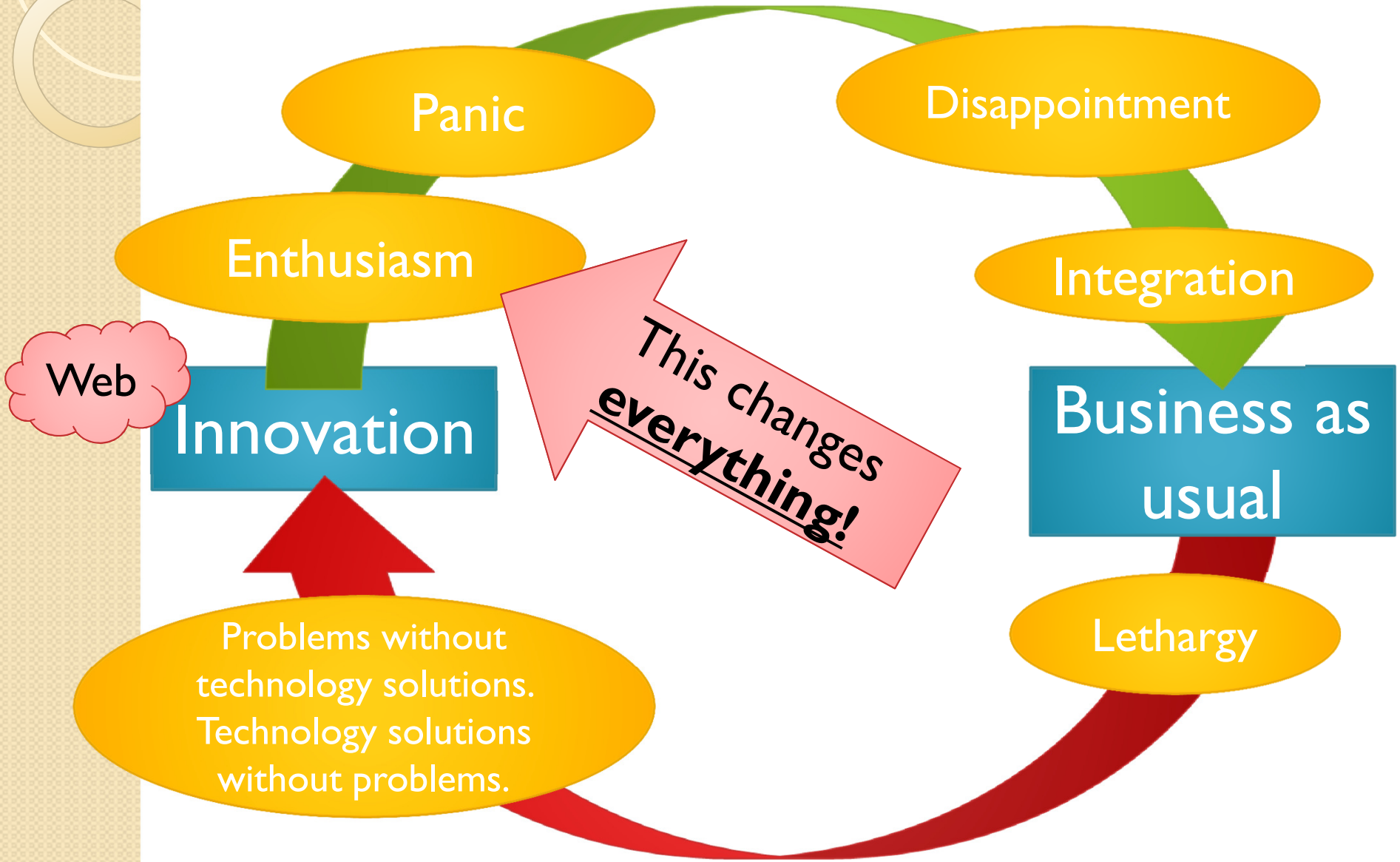
Traditional Transmission

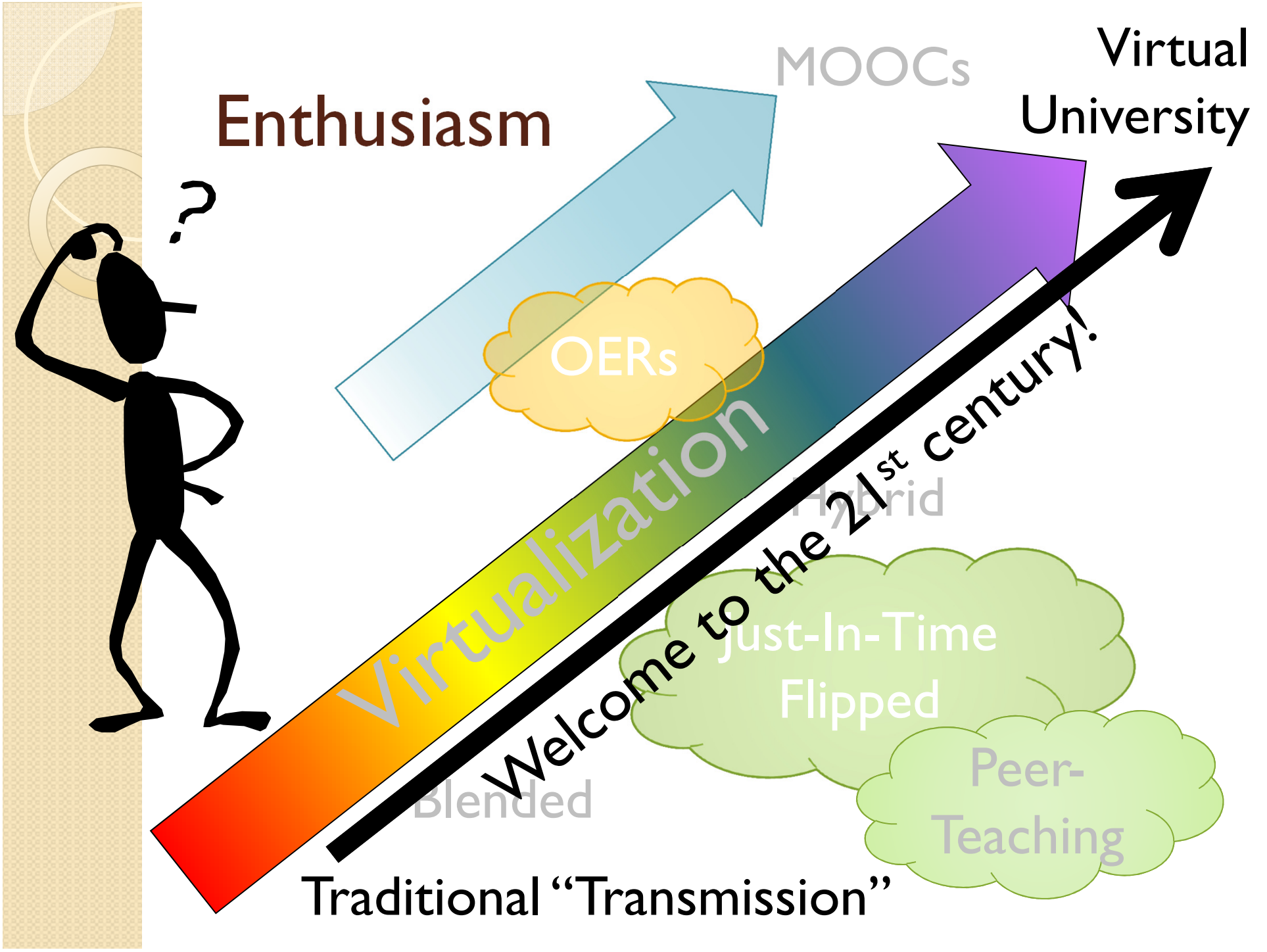
- Late 20th century
- The web!
- Next chance to reform lecture …
  - … but instead

Traditional Transmission

- Traditional lectures remain unchanged
- The Virtual University is born!

The First Wave – Virtual Universities!




Enthusiasm
?
MOOCs
Virtual University
OERs
Virtualization
Welcome to the 21st century!
Hybrid
Just-In-Time
Flipped
Peer-Teaching
Blended
Traditional "Transmission"

Enthusiasm

"The next big killer application on the internet is going to be education. Education over the internet is going to be so big it is going to make e-mail usage look like a rounding error."

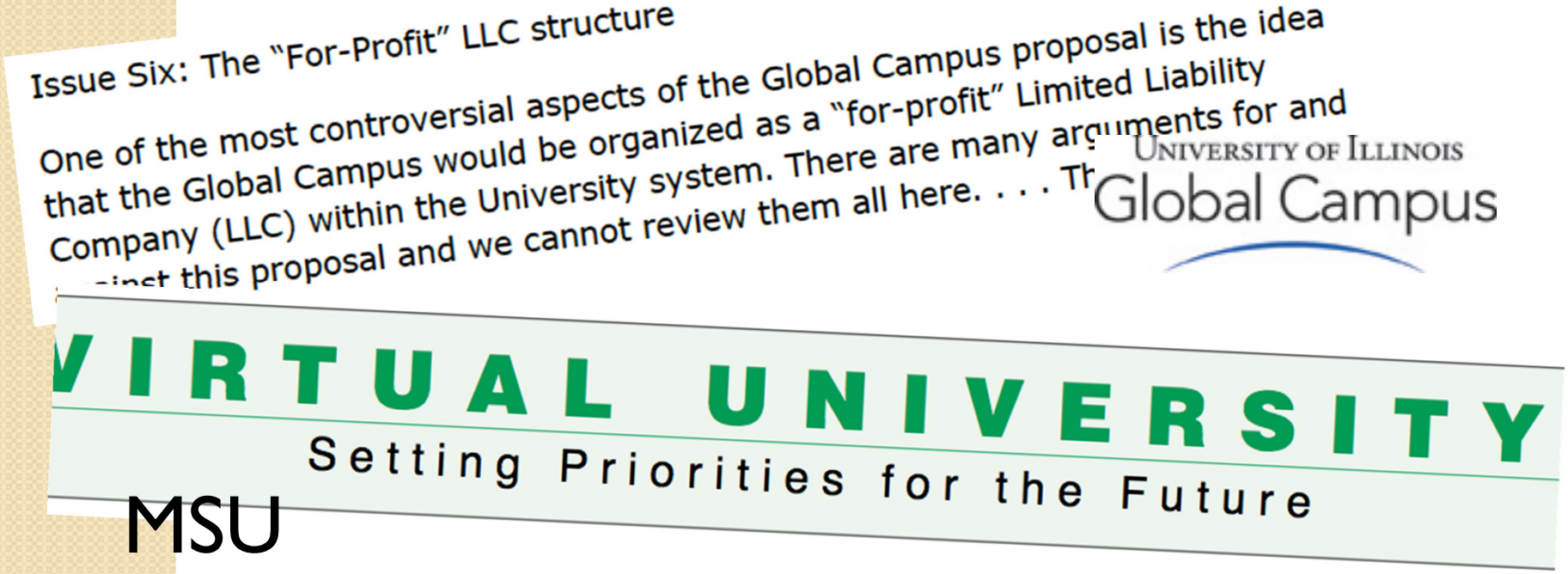
John Chambers,
CEO, Cisco Systems,
1999

Panic: being left behind

- The dream of the „Virtual University“
- Every backwater college wanted customers from around the World
  - Tuition, tuition, tuition, ...
- Huge investments:
  - Instructors were provided access to graphical artists, instructional designers, etc.
  - Courses were “produced”
  - The universities claimed ownership of the developed materials

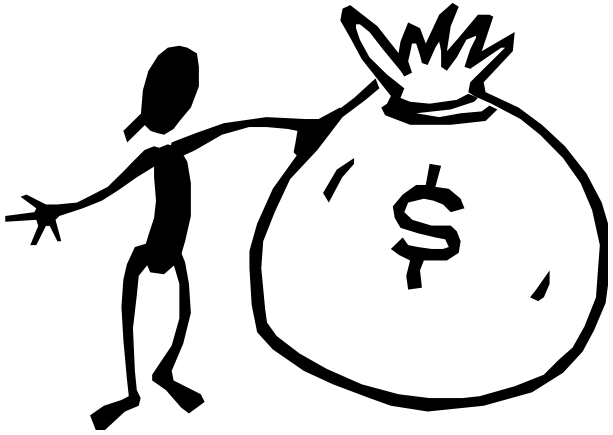
Panic: being left behind

- Examples:
  - Early, 1996: MSU Virtual University
  - Late, 2006: UIUC Global Campus



Panic: being left behind

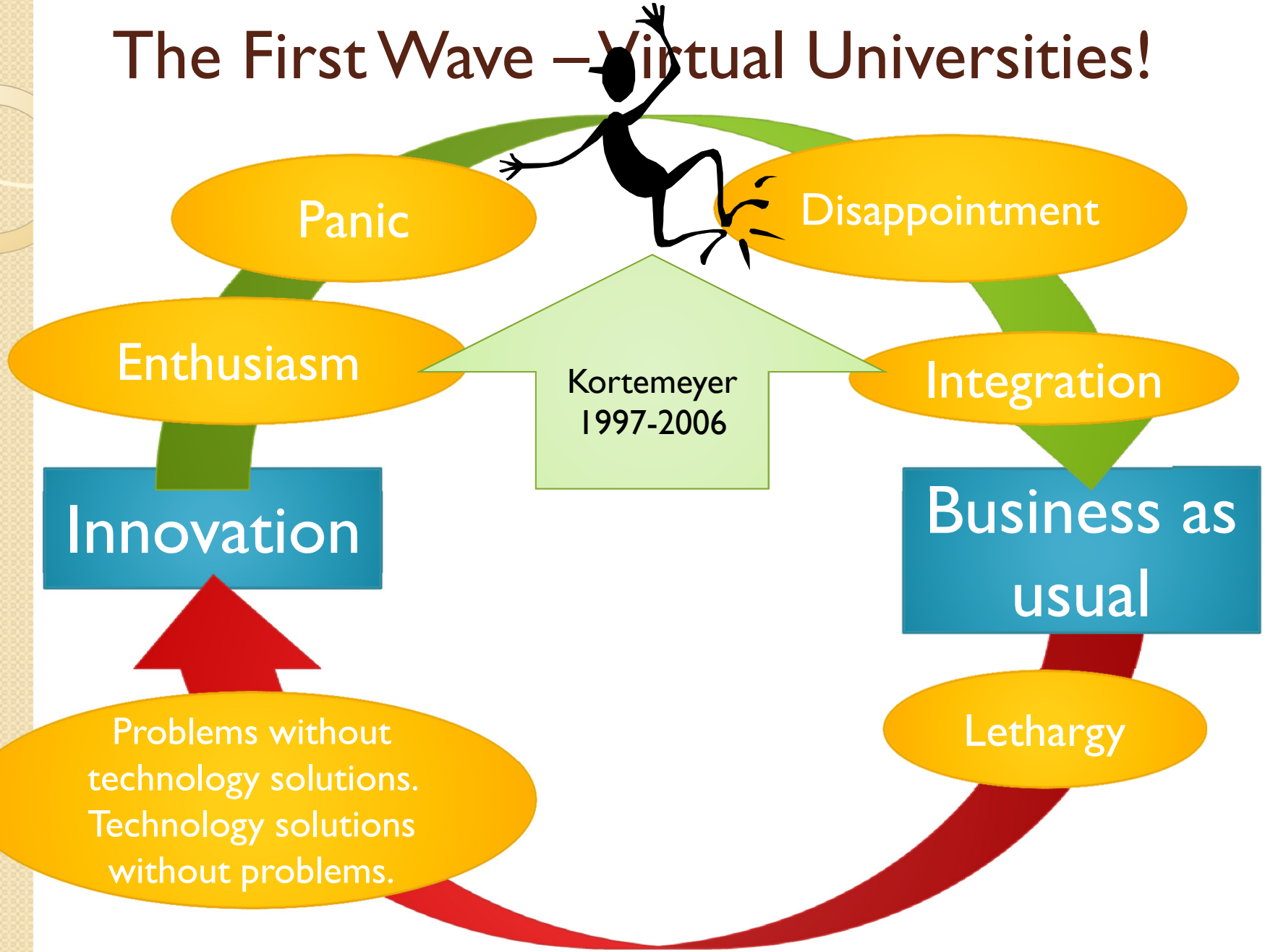
- The dream of getting rich quickly
- You pay a professor one time to create the course
- You hire temporary staff to run the courses over and over and over
- The professor goes on to do the "more important things," like contracts and grants



Panic: being left behind

- Investment in Course Management Systems
  - Many universities develop their own systems
  - Plentiful funding
  - Innovative new approaches
- Birth of LON-CAPA in 1999

The First Wave – Virtual Universities!

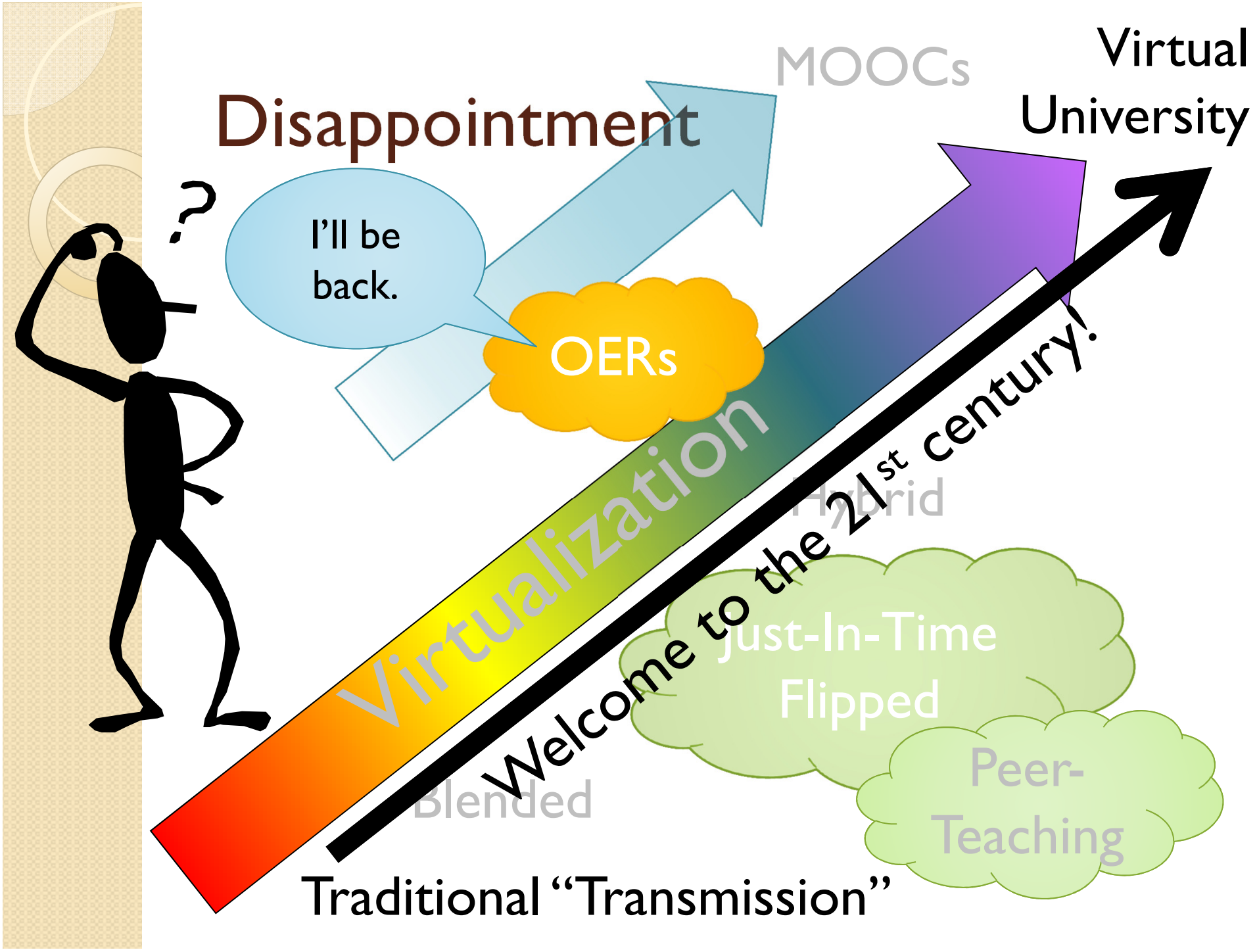


Disappointment

- MIT charges ahead with the Open Knowledge Initiative (OKI)
  - „Betamaxes“ some other systems
  - Fizzles out and eventually gets picked up by the University of Michigan et al. to become Sakai
  - But I still like the people … ☺

Disappointment

- 2002: MIT again charges ahead with Open CourseWare
  - First nail in the coffin of Virtual Universities
  - Clear signal: online educational materials have no monetary value
  - Birth of the Open Educational Resource (OER)


Disappointment
MOOCs
Virtual University
I'll be back.
?
OERs
Virtualization
Welcome to the 21st century!
Hybrid
Just-In-Time
Flipped
Peer-Teaching
Blended
Traditional "Transmission"

Disappointment

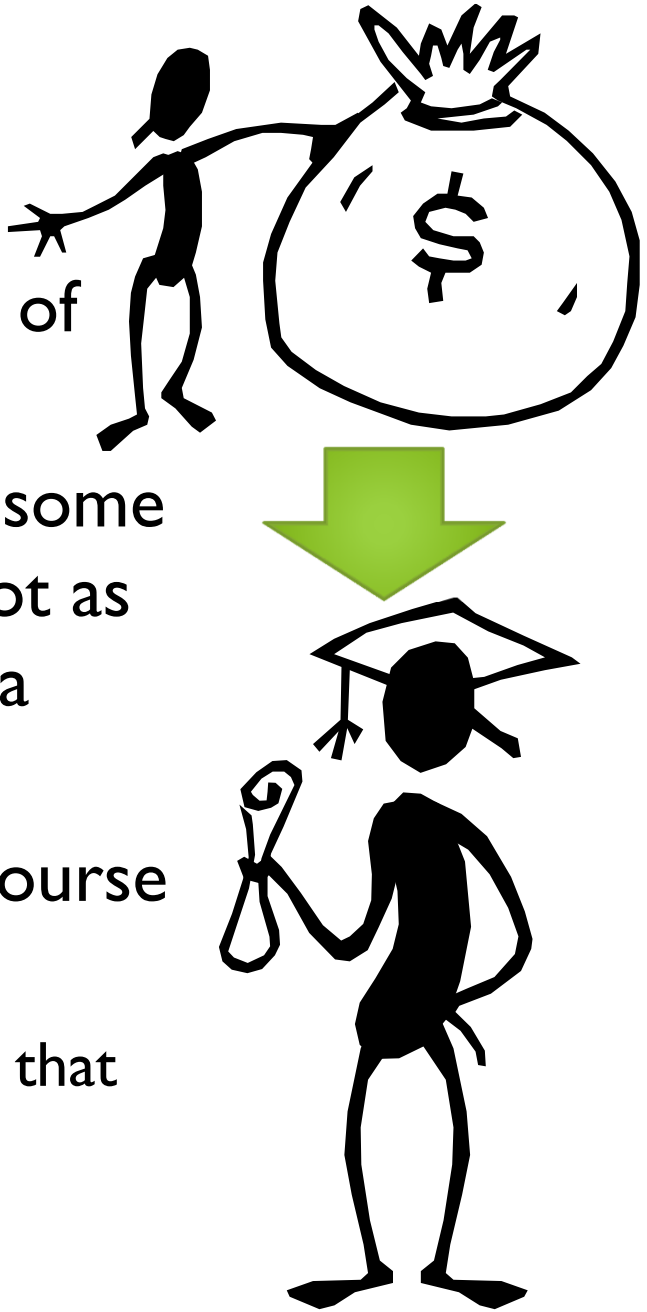
- Universities sell degrees, not education

Disappointment

- Customers from all over the World are not coming
- And why should they?
  - High tuition (often as opposed to free)
  - Problems in transferring credits
  - Cheaper competition (University of Phoenix, etc.)
  - No cultural experience online

Disappointment

- Customers buy certification of knowledge
- Problem: Certification from some random Virtual University not as valuable for employment as a "real" degree
- Also: lack of experience in course development
  - some online programs just not that good



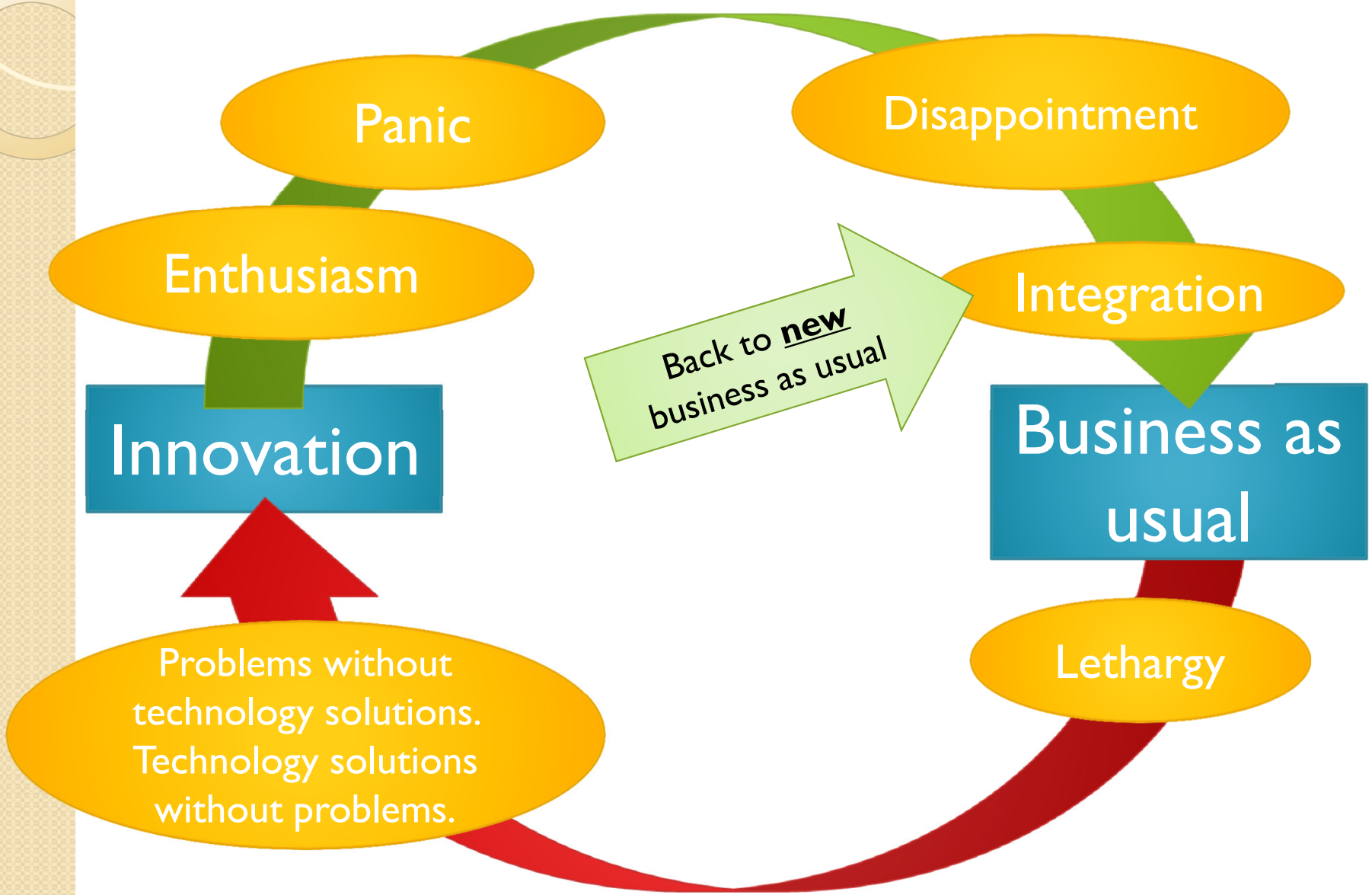
Disappointment

- Realization: you cannot run a course over and over and over
- An online course needs maintenance:
  - Materials and technologies become outdated
    - Shockwave, RealMedia, old codecs, **Java**, …
  - Not a self-runner
- End of the get-rich-quick dream!

Disappointment

- University of Illinois Global Campus 2006-2009

The First Wave – Virtual Universities!



Disappointment to Integration

- MSU Virtual University still offers courses and programs
  - but these are now in the hands of the **departments**
  - Famous line by provost at the time: faculty are now expected to master technology
  - In return, the departments get a bigger portion of the tuition
    - same tuition for students, but more profit for departments
    - strange side effect: now it pays to put own students into online sections

Integration

- Often specialized graduate programs that are completely online or have some online courses
  - 20 fully online degrees
  - 16 partly online degrees

Degrees, Minors, and Specializations
(Approved at the University-level and Listed on the Michigan State University Transcript)

Program Name - Degree	Delivery
Biomedical Laboratory Operations - Master of Science (AP)	Online
Biomedical Laboratory Science - Master of Arts (AP)	Online
Clinical Laboratory Science - Master of Science (AP)	Online
Criminal Justice - Master of Science (AP)	Online
Education - Master of Arts (AP)	Online

  - But also some undergraduate courses

Integration

- Example: Department of Physics and Astronomy

	Algebra-Based	Bridging Courses	Calculus-Based
1st Semester: Mechanics	PHY 231C *3 credits*	PHY 233B *2 credits*	PHY 183B *4 credits*
2nd Semester: Electricity & Magnetism	PHY 232C *3 credits*	PHY 234B *2 credits*	PHY 184B *4 credits*
Modern Physics & Thermodynamics			PHY 215B *3 credits*

When can I take it?

These courses can be taken at different times during the academic year:

	Fall Semester	Spring Semester	Summer Semester *First Half*	Summer Semester *Second Half*
PHY 231C (algebra)	Regular full semester	Regular full semester	Intensive	
PHY 232C (algebra)	Regular full semester	Regular full semester		Intensive
PHY 233B (bridging)	Regular full semester	Regular full semester	Intensive	
PHY 234B (bridging)		Regular full semester		Intensive
HY 183B (calculus)			Regular full summer term	
184B (calculus)			Regular full summer term	
215B (calculus)			Regular full summer term	

Convenience!

In particular, this means that the **algebra-based sequence or the bridging sequence can be completed during a single summer term**.

Integration

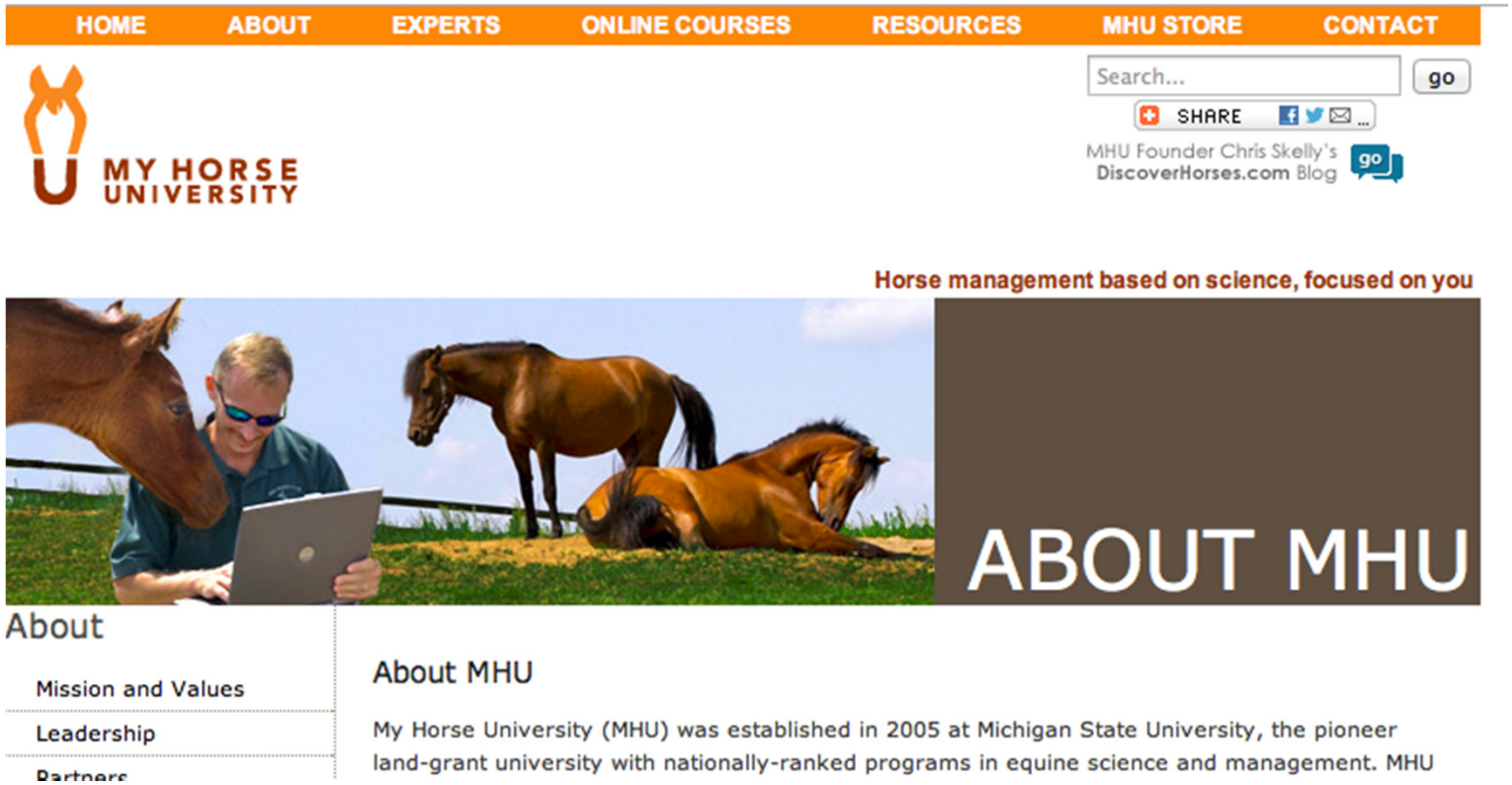
- And exams?
  - If within 30 miles of campus, make students come to on-campus exam sessions (often in the evenings)
  - If beyond 30 miles, students need to arrange for proctors
    - E.g., overseas military: commanding officers
    - Approval process
    - Fax/email exams

Integration

- MSU Virtual University was integrated into campus as "Learning Design and Technology"
- Some support for faculty
- Big problem: usage of this facility is one of the "tripwires" for intellectual property
  - University claims ownership

Integration

- Additional not-for-credit online options under University Outreach
  - Certificates in gardening and animal care



Integration

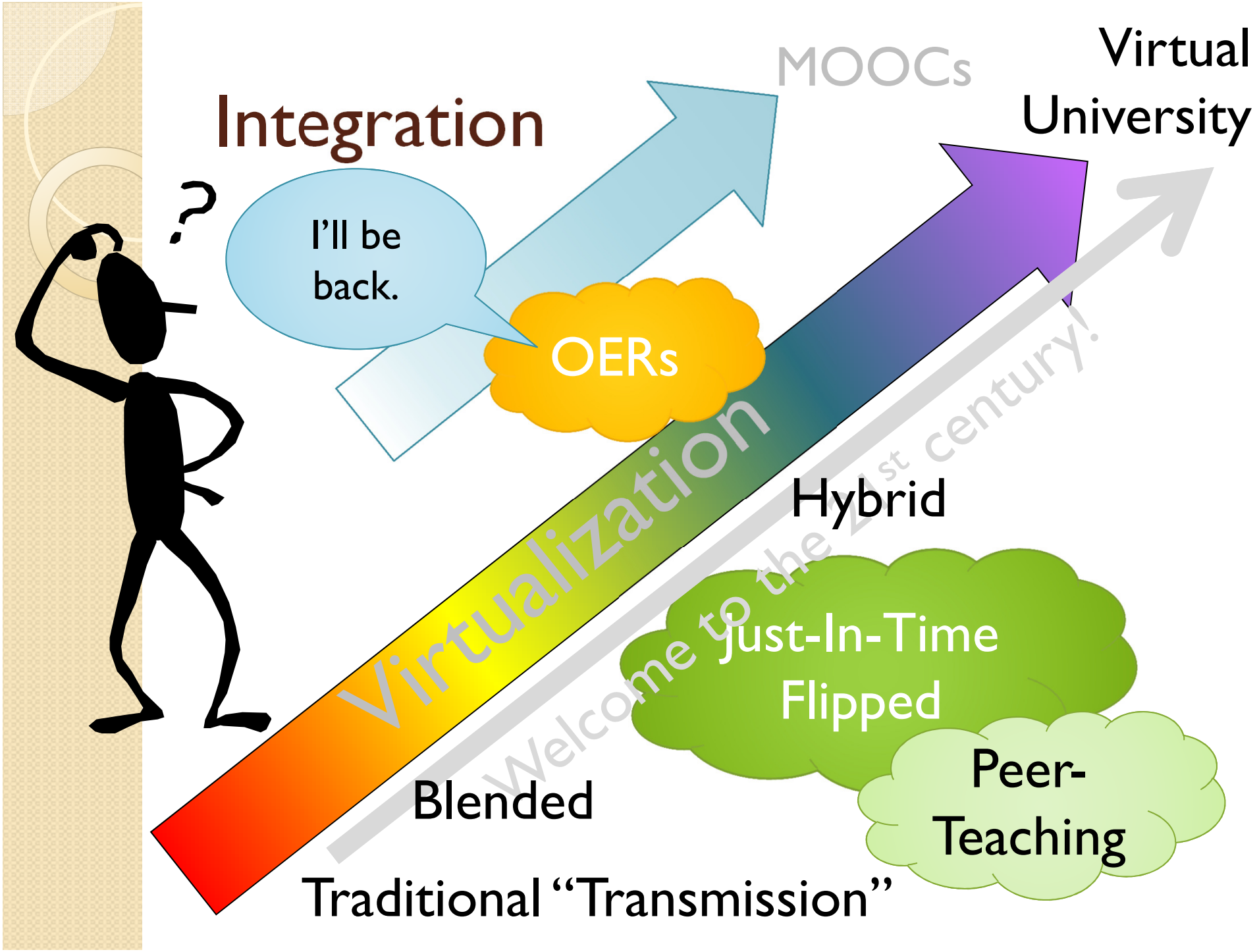
- Back to traditional lectures:
  - Fun for us, since we like to hear ourselves talk
  - Students might think they make a difference
    - But they don't
  - And yes, even the most charismatic lecturer cannot bring about better learning
    - Only more excitement and appreciation for the subject
      - Not to be underestimated!
- But in the end, the learner has to do the hard work
  - Thus, reformed curricular, technology-facilitated

Integration

- The minor miracle happens …
  - … quietly, lectures change through technology!

Integration

- Students expect at least some online components
- Online became integrated and integral part of "normal" courses
- Most any course has some online component:
  - Accompanying lectures
  - Grades
  - Online homework
  - Hybrid/blended
- Instructors have to manage that themselves

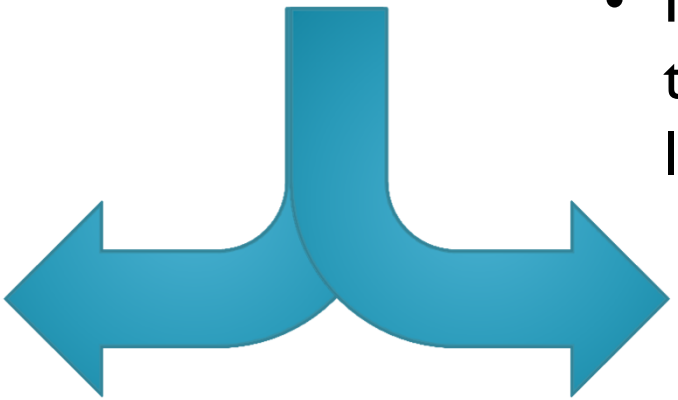

Integration
?
I'll be back.
MOOCs
Virtual University
OERs
Virtualization
Hybrid
Welcome to the 21st century!
Just-In-Time Flipped
Peer-Teaching
Blended
Traditional "Transmission"

Integration

- Physics students have a choice!

Online/virtual class

- More effective than traditional lecture
  - Proven on traditional exams
- More efficient
- Convenient



Blended/reformed class

- More effective than traditional lecture
  - Proven on concept tests and research
- More work
- Challenging

CY13: 1653 enrollments
I taught these in 2001/2002 +
Online Prep Course since 2012

CY13: 4950 enrollments
I taught these
since 2004

Integration

Doing only free online

- Blended: Textbook and online materials
  - very normal
- Hybrid: Some classroom time is replaced by online venues
  - rare (at MSU)

Doing this

- Peer Teaching:
  - Physics: almost malpractice not to do this

Doing more of this

- Flipped: Knowledge transmission online, outside the classroom
  - up and coming

Integration

Doing only free online

- Blended: Textbook and online materials
  - very normal
- Hybrid: Some classroom time is replaced by online venues
  - rare (at MSU)

Doing this

- Peer Teaching:
  - Physics almost malpractice not to do this

Doing more of this

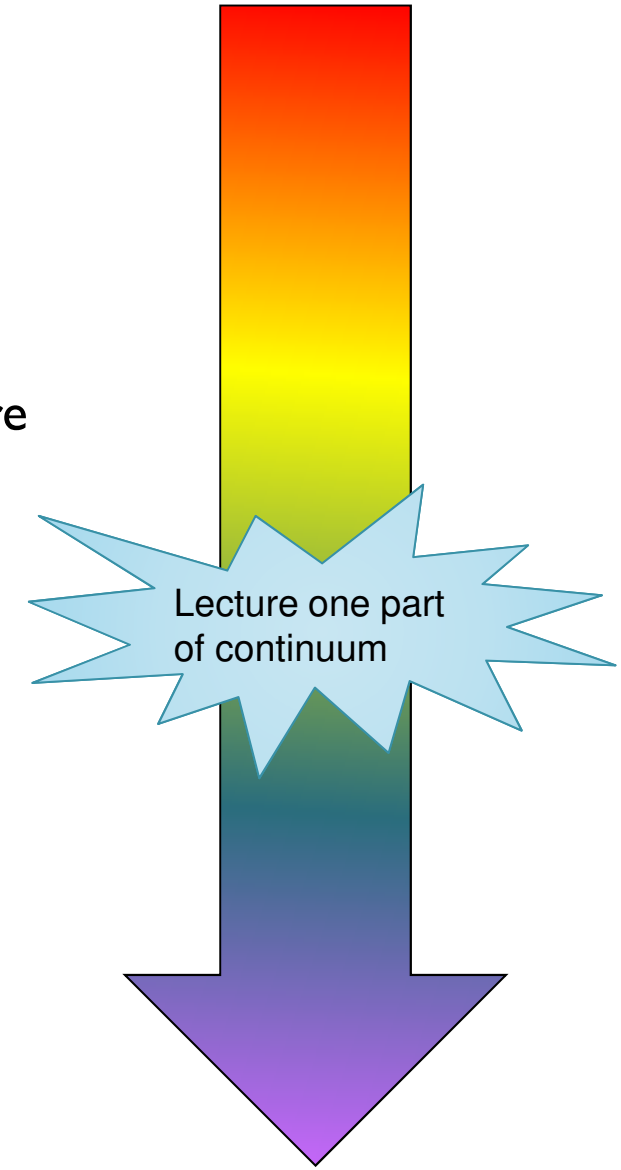
- Flipped: Knowledge transmission online, outside the classroom
  - up and coming

No one size fits all

Integration

My class, calculus-based physics

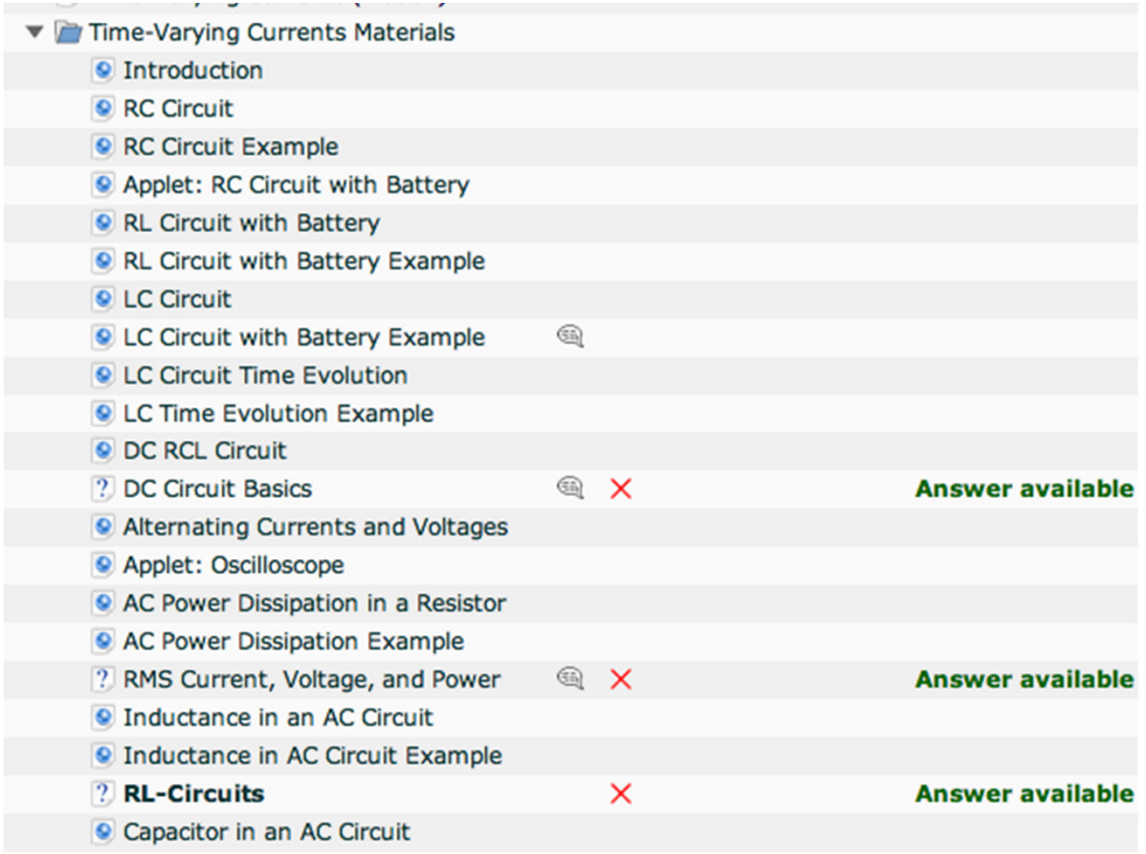
- Pre-Class Questions
  - Own online textbook
    - Free!
  - Students being prepared for lecture
  - Just-In-Time Teaching
- In-Class Questions
  - Clickers
  - Problem solving
- Post-Class Questions
  - Homework
  - Online Discussions, Helprooms
  - Handwritten, handgraded exams
    - Change from before



Integration

My course:

- Easy questions, embedded into online reading materials
- Due before lecture



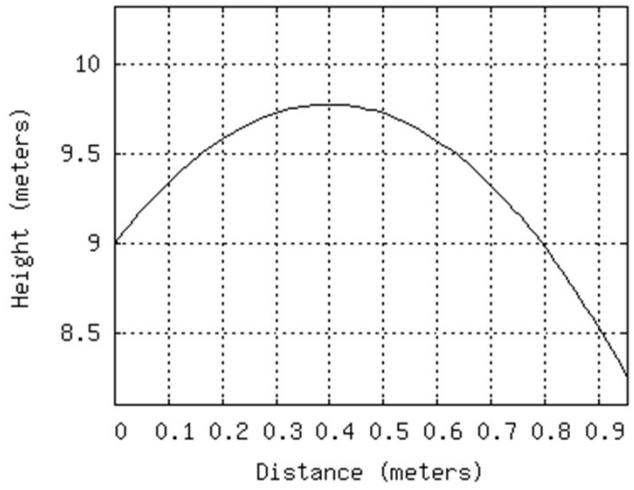
Integration

- The questions make sure that the students actually read the materials
  - Can be answered based on just the reading (low Bloom-level)
- Problems slightly different from student to student
  - Students cannot simply copy answers
  - More later
- Students come prepared to lecture

Which of the following statements are true?
False: In a circuit consisting of an AC voltage source and a resistor, the dissipated power is proportional to the current.
True: In a circuit consisting of an AC voltage source and a resistor, the voltage drop across the resistor and the voltage source are in phase.
True: The rms-voltage is proportional to the maximum AC-voltage.
True: In a circuit with a capacitor and inductance in series (no resistance), if the capacitor is initially charged, an un-damped harmonic oscillation takes place.

Computer's answer now shown above. Tries 0/6

Integration



The plot shows the trajectory (height versus distance) of an object launched at an angle of 75.6 degrees. What was the initial speed of the object? **4.0 m/s**
Computer's answer now shown above. Tries 0/12

Threaded View Chronological View Sorting/Filtering options Export?

Anonymous 1 (Fri Sep 22 01:26:29 2006 (EDT))

any hints to start?

Re: *Anonymous 2* (Fri Sep 22 01:56:48 2006 (EDT))

You need to find the Y component of velocity... you can do this by finding the height traveled (notice it does not start on the ground) and combining that with acceleration in a kinematics equation. From there use trig to get the original velocity.

Re: Re: *Anonymous 1* (Fri Sep 22 12:10:37 2006 (EDT))

how can we find the height traveled and how can we get the acceleration if we don't have the time?

Anonymous 3 (Fri Sep 22 16:41:27 2006 (EDT))

i'm lost on this one... can anyone help?

Re: *Anonymous 4* (Fri Sep 22 20:02:45 2006 (EDT))

Use the squared kinematics equation - so Vf^2 = Vi^2 + 2a (Xf-Xi).

Discussions

Encouraged, since all students have different versions.

Feedback and peer-instruction.

Integration

Course Action Items

Gerd Kortemeyer
Course Coordinator
LBS 272 - Spring 2006

LBS 272 - Spring 2006->Display Action Items | What's New?

Go to first resource
Page set to be displayed after you have selected a ...hat's New? page (user preference) **Change** for just this course or for all your courses.

Hide all Show all

Discussions

Problems requiring handgrading Hide

Problem Name	Number ungraded
Electric Field	4

Difficult problems

Problems with errors Hide

No problems with errors

Problems with av. attempts ≥ 3 or deg. difficulty ≥ 0.8 and total number of students with submissions ≥ 4 Hide

Change thresholds?

Resource	Part	Num. students	Av. Attempts	Deg. Diff	Last Reset	Reset Count?
Field Lines	single part	24	2.12	0.84		☐
Net Force	single part	53	2.49	0.80		☐
Pith Balls	single part	52	4.12	0.90		☐

Reset counters to 0

Resources in course with version changes since last week Hide

Change interval?

Resource	Last revised	New version	Version used
Applet: Electron Orbit	Fri Jan 13 10:18:52 2006 (EST)	10	10
Capacitance of a Sphere	Mon Jan 16 12:03:13 2006	8	8

Unread course discussion posts Hide

Change options?

Location	Type	Time of last post	Number of new posts
Coulomb	Resource	last Monday, Jan 16 at 04:55 pm (EST)	1
Distance Change	Resource	last Monday, Jan 16 at 07:00 pm (EST)	1
Field Lines	Resource	last Monday, Jan 16 at 07:49 pm (EST)	1
Force	Resource	on Wednesday, Jan 11 at 07:01 pm (EST)	3
Net Force	Resource	23 hours, 19 minutes ago	5
Pith Balls	Resource	last Monday, Jan 16 at 09:21 pm (EST)	6
Point P	Resource	last Friday, Jan 13 at 02:34 pm (EST)	5
Potential	Resource	last Sunday, Jan 15 at 03:15 pm (EST)	1
Two Charges	Resource	last Sunday, Jan 15 at 03:26 pm (EST)	1
Vector	Resource	last Saturday, Jan 14 at 01:32 am (EST)	1
Vectors	Resource	last Saturday, Jan 14 at 12:09 pm (EST)	2

New course messages Hide

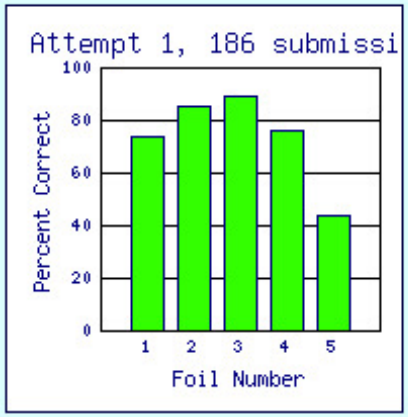
Number	Subject	Sender	Date/Time
1.	Feedback [msu/mmp/kap18/problems/cd460.problem]	[redacted]@msu	Sat Jan 14 10:45:02 2006 (EST)

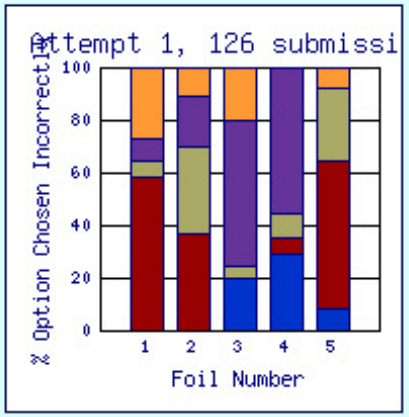
New critical messages in course Hide

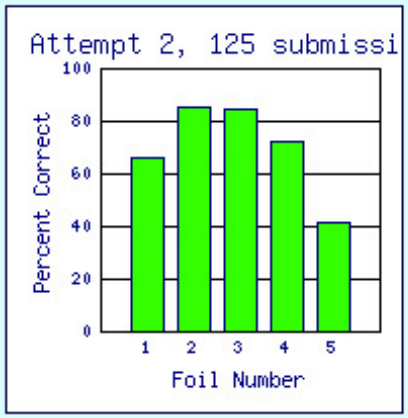
Support in lecture preparation through dashboard

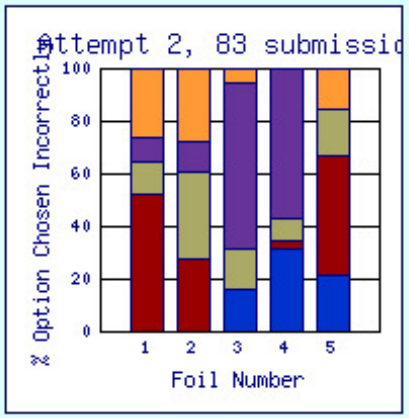
Integration

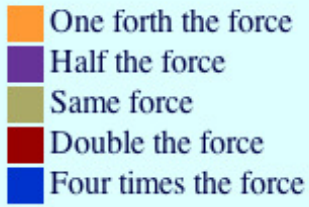
Foil Number	Foil Name	Foil Text	Correct Value
1	1_6_1_1_2	The distance between the two charges is cut in half.	Four times the force
2	1_6_1_2_2	The magnitude of both charges is doubled.	Four times the force
3	1_6_1_3_2	The magnitude of one of the two charges is doubled.	Double the force
4	1_6_1_4_2	The distance between the charges is doubled.	One forth the force
5	1_6_1_5_2	The charges are placed in a medium with a factor two higher permittivity.	Half the force

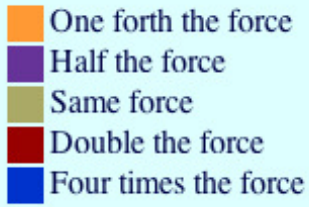






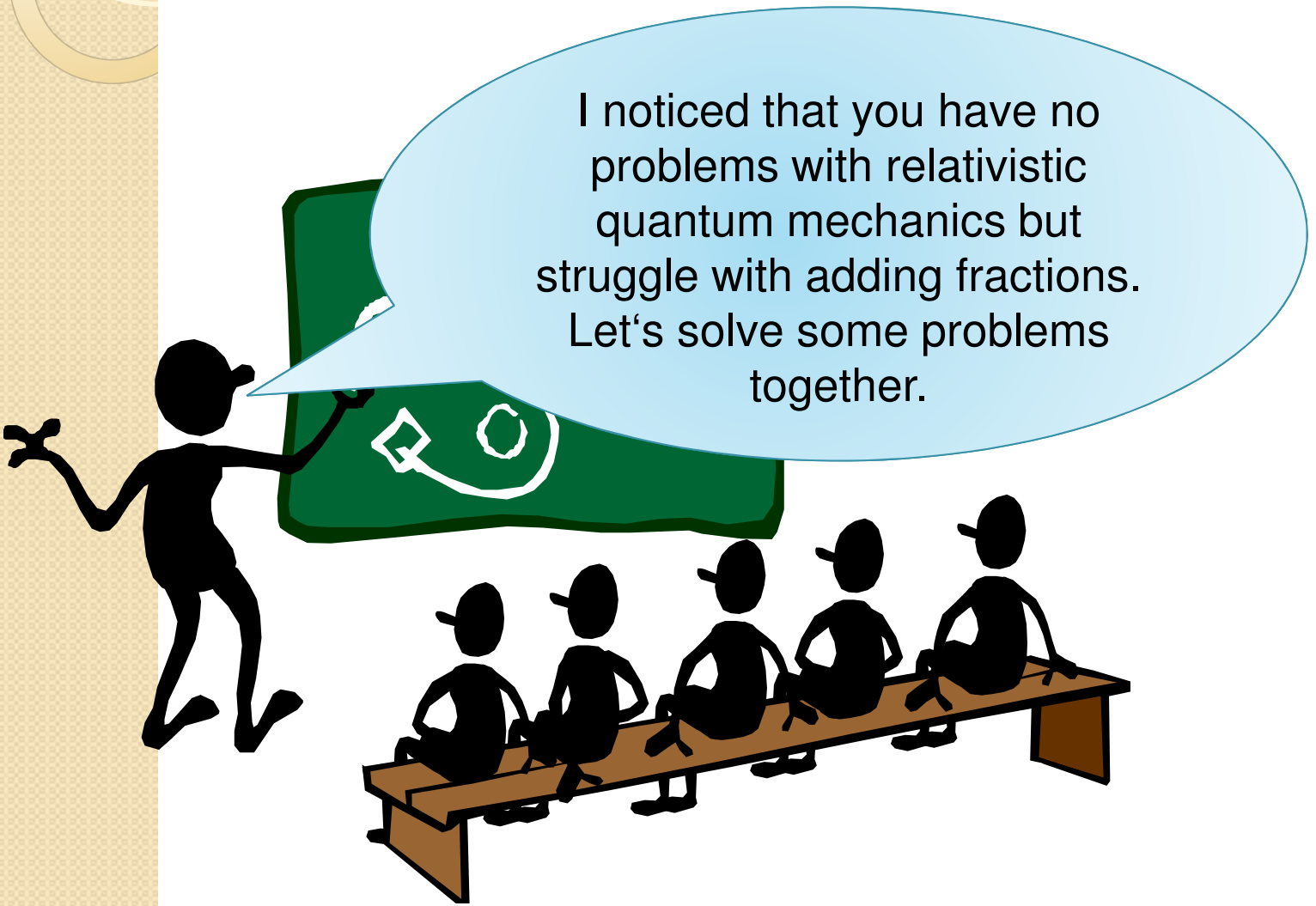






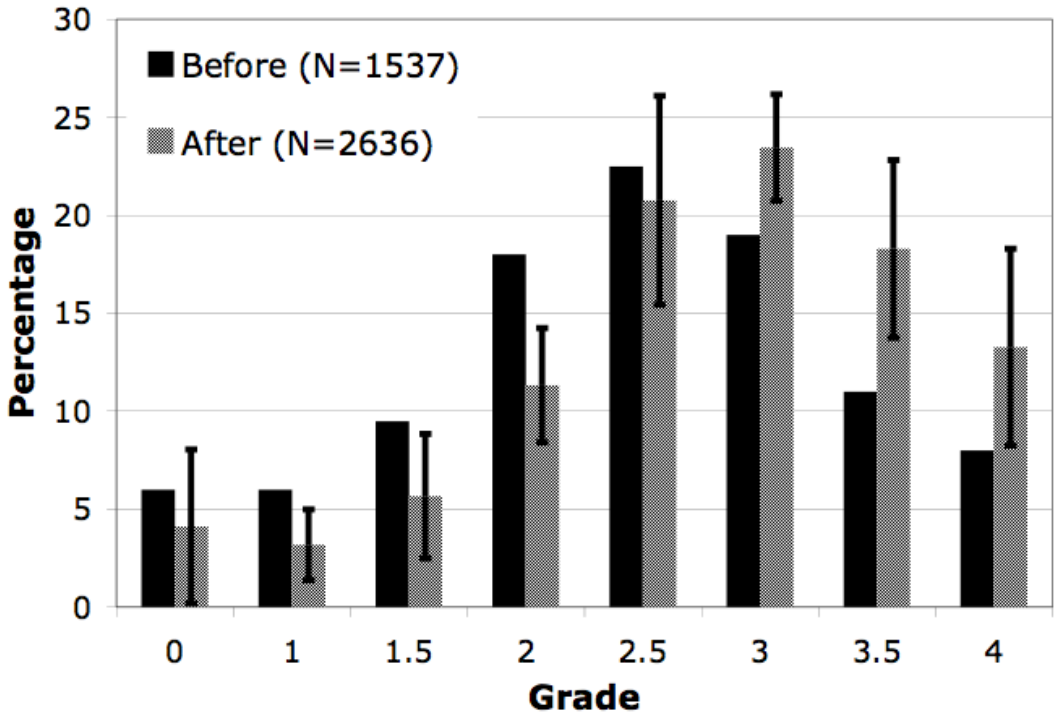
Integration

- Adjust lecture to actual student problems



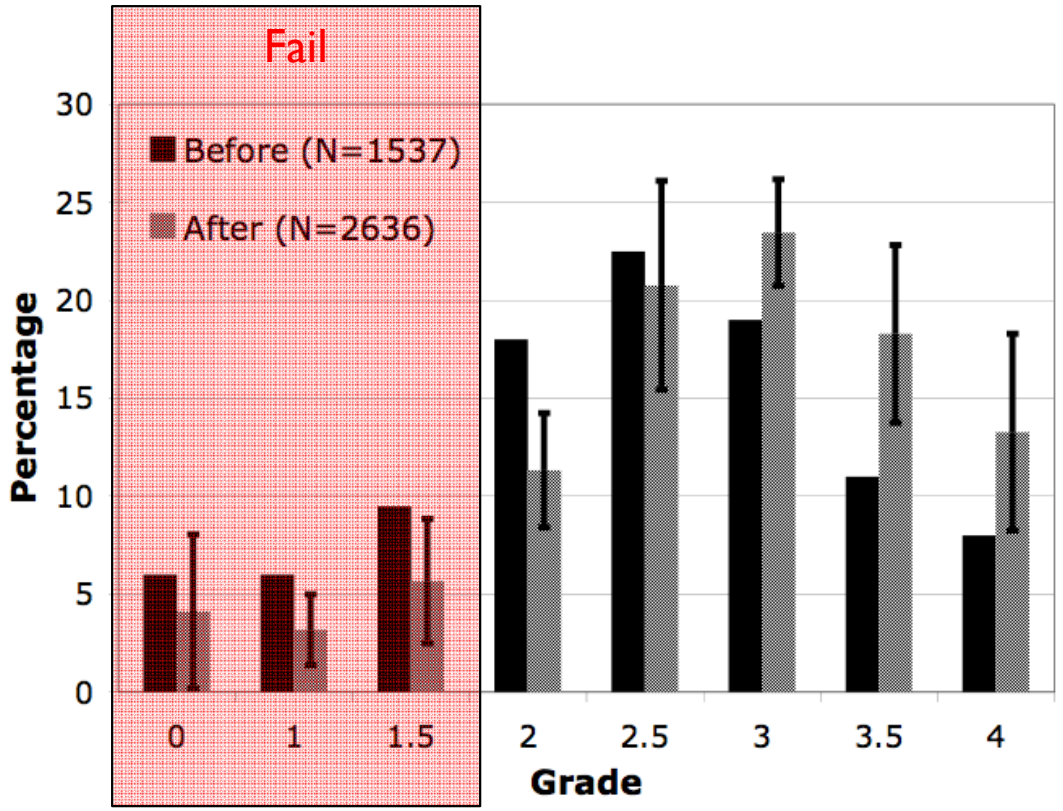
Integration

- Intro Physics for Scientists and Engineers
- Moved to blended format
- Grades in years before and after online homework



Integration

Mostly helped students who are on the brink of failing the course.

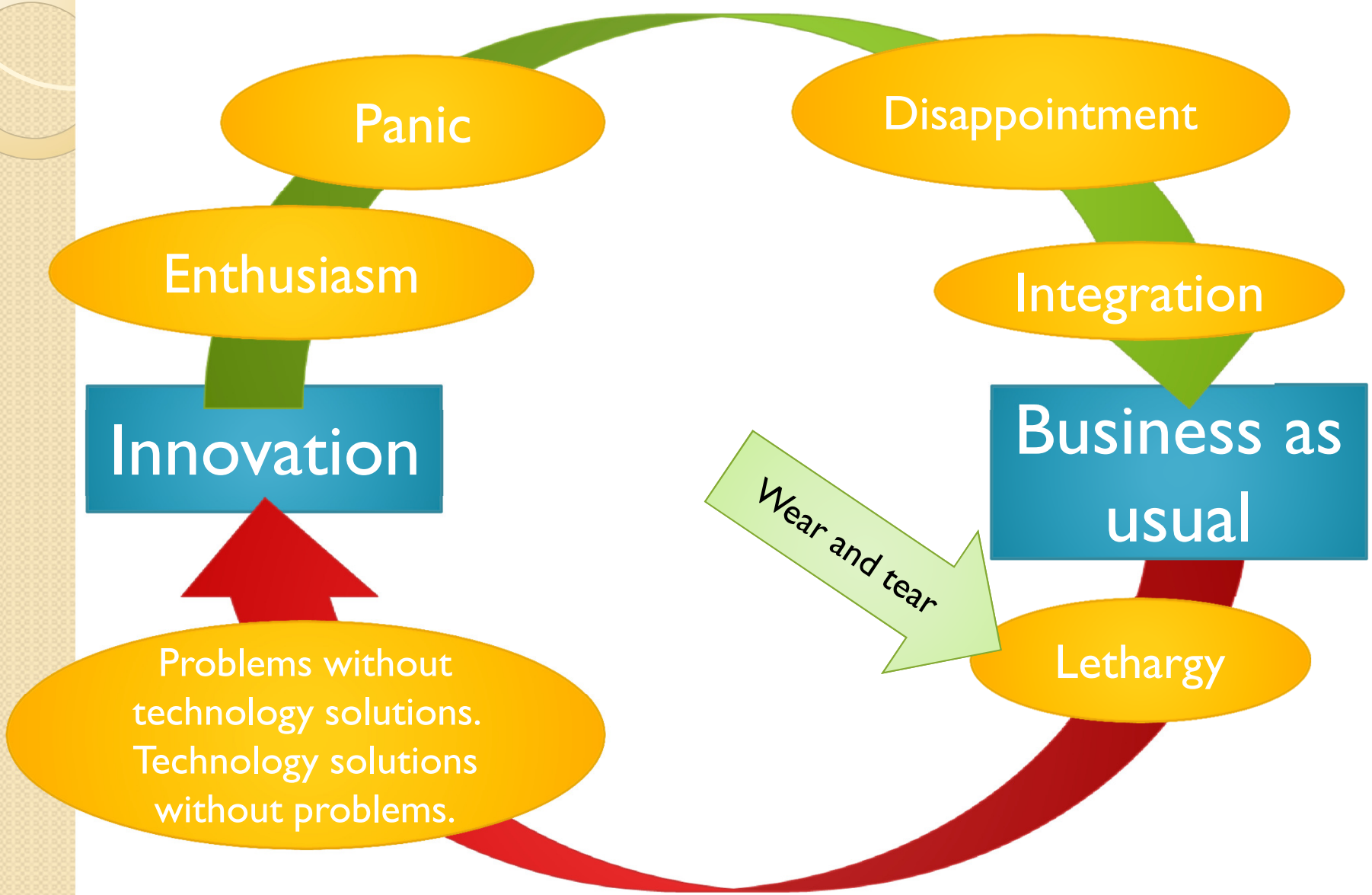


Integration

- Course Management Systems become mission-critical
- Chief Information Officer at a large university:

  „We can do without email for a day, but we cannot do without course management for an hour [...] It would cause major disruptions“

The First Wave – Virtual Universities!



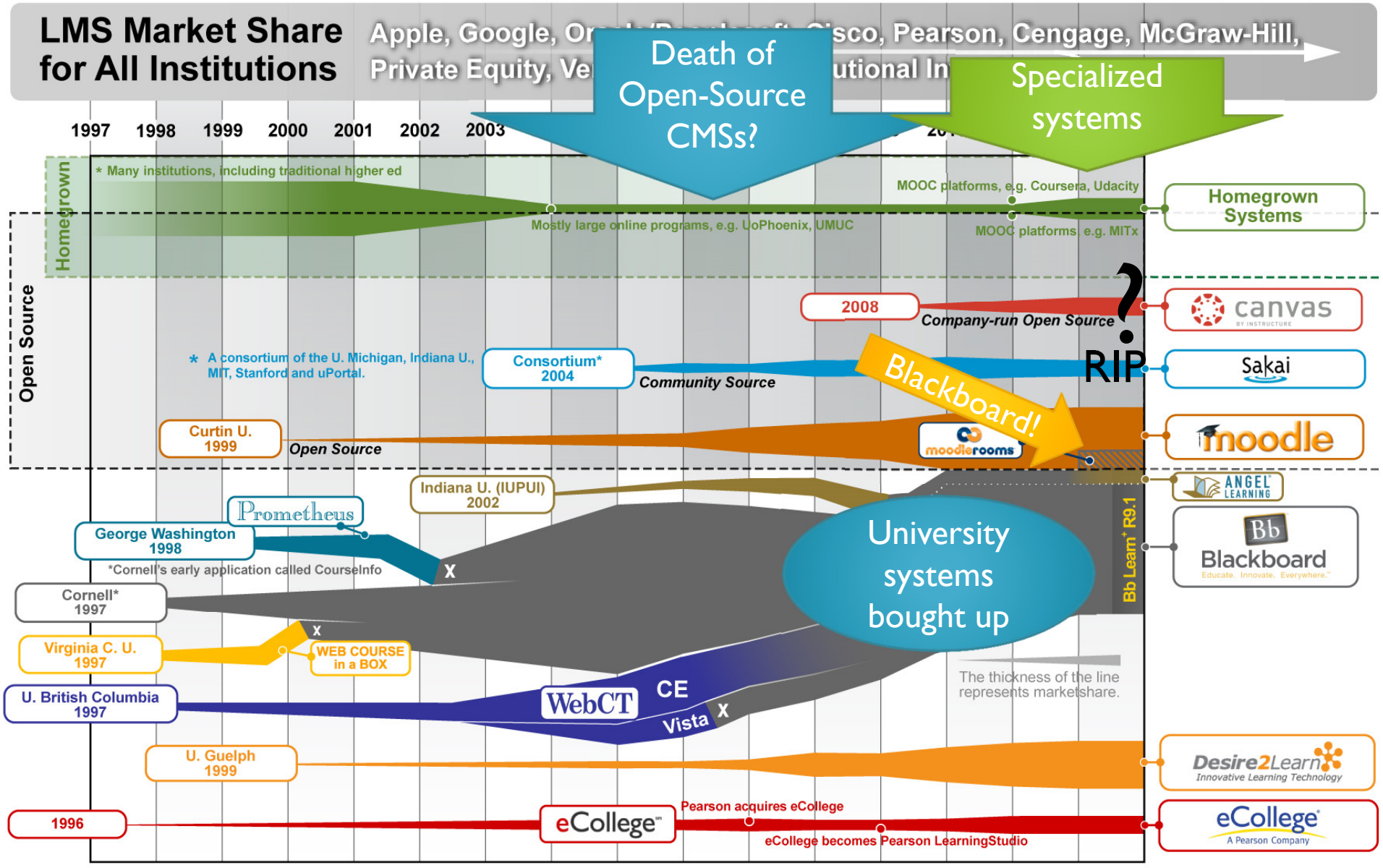
Lethargy

- Difficult times for open-source and innovation in Course Management Systems
- The cost for running these systems is comparable to the licensing fees
  - about $400k/year in licensing fees
  - over $400k/year in staff and support costs
- Without a vendor: more staff needed locally
  - Off-the-shelf cheaper than own development
  - “For free” does not pay off

Lethargy

- The Open-Source Myth:
  - Projects will be advanced by a large number of programmers from around the World
  - Rapid bug fixes
  - Easily adaptable software
  - Sustainable because supported by a number of universities
- History currently does not reflect this
  - … instead …

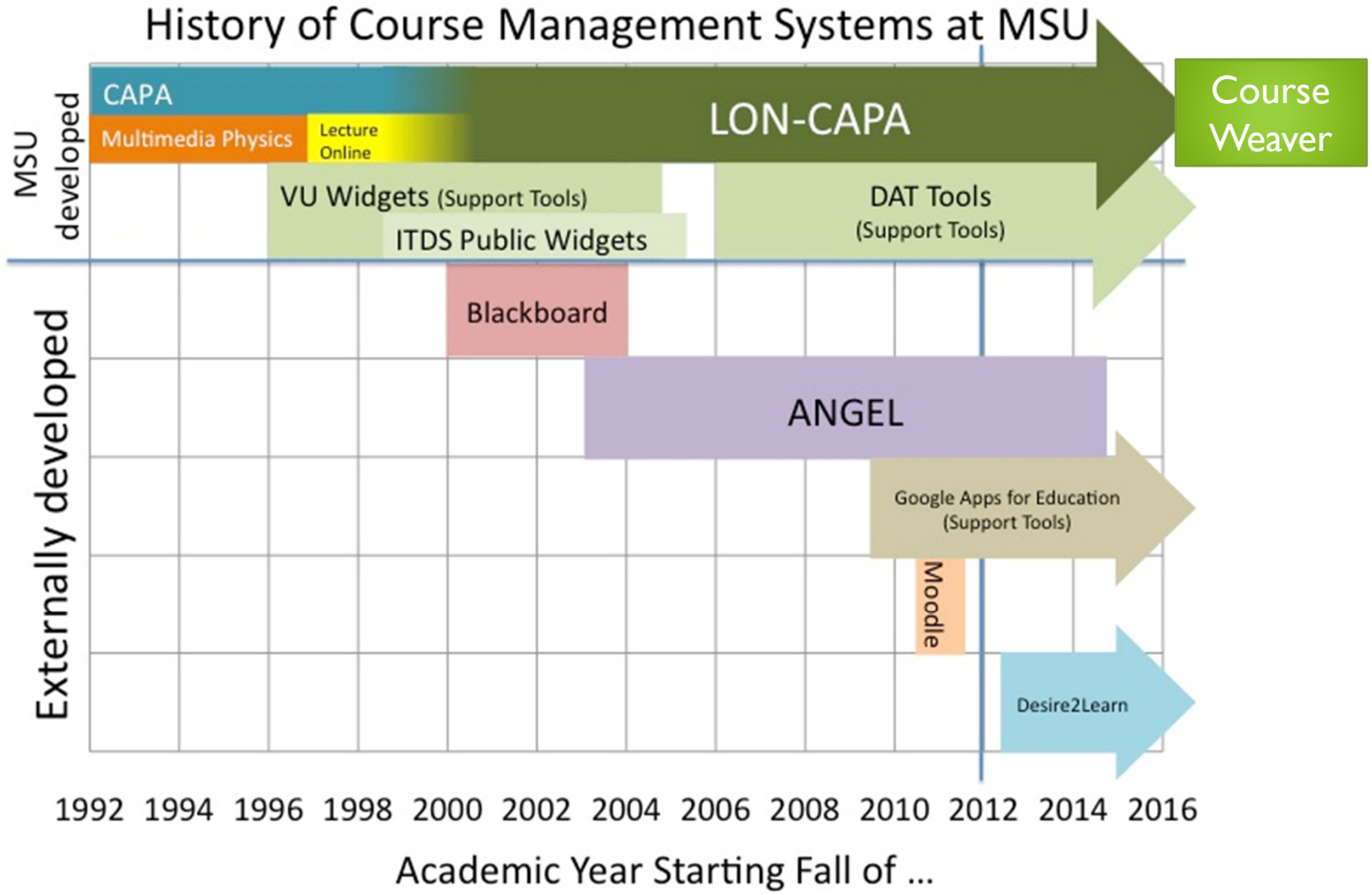
Lethargy



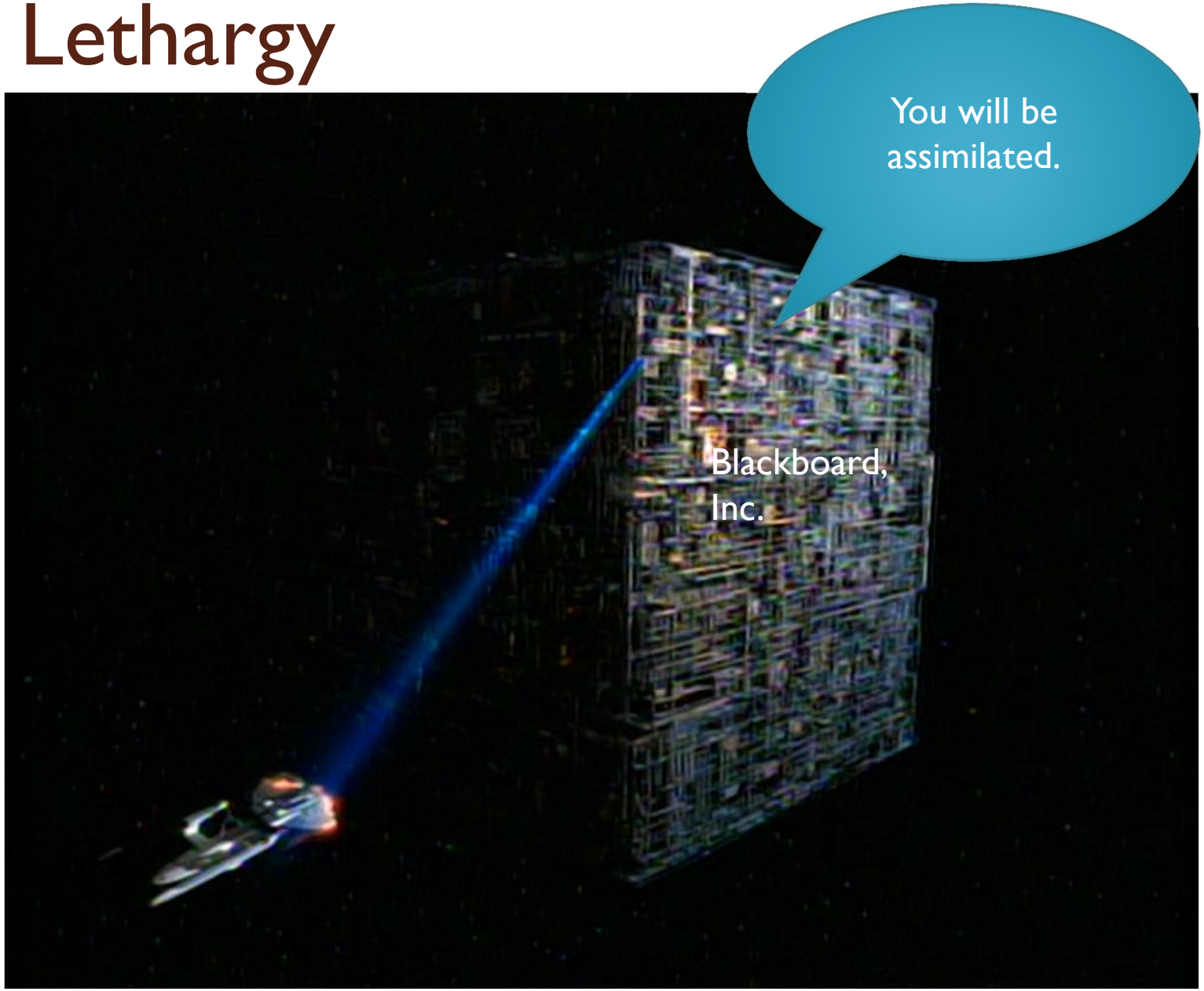
Market share in terms of institutions & online programs selecting LMS
Key data from 2005 - 2009 from Campus Computing project http://www.campuscomputing.net

delta initiative

Lethargy


History of Course Management Systems at MSU
MSU developed
Externally developed
CAPA
Multimedia Physics
Lecture Online
LON-CAPA
Course Weaver
VU Widgets (Support Tools)
ITDS Public Widgets
DAT Tools (Support Tools)
Blackboard
ANGEL
Google Apps for Education (Support Tools)
Moodle
Desire2Learn
1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012 2014 2016
Academic Year Starting Fall of ...

Lethargy



Lethargy

Unfortunately not true: what was good about the university systems, WebCT, and ANGEL, did not survive the assimilation.

We are the market leader. Lower your shields and surrender your code. We will add your educational and technological distinctiveness to our own. Your culture will adapt to service us.

Lethargy

Unfortunately not true: what was good about the university systems, WebCT, and ANGEL, did not survive the assimilation.

We are the market leader. Lower your shields and surrender your code. We will add your educational and technological distinctiveness to our own. Your culture will adapt to service us.

No one size fits all

Lethargy

- Administration often lethargic about the fact that different topics and teaching styles need different tools
  - Even though: Physics/Chemistry lecture hall looks different than Art History seminar room
  - Have multiple tools, but tie them together through single-sign-on (like Shibboleth)
- BlackBoard monolith stifles innovation and pedagogy

Lethargy

- Sakai as good as dead
  - Chief Architect working part-time for BlackBoard
  - Remainder joined JASIG
- Moodle damaged
  - Rejected at larger universities:
    - Lacking support
    - Scalability
  - Support company MoodleRooms bought by BlackBoard
- Canvas had great market entry
  - Sort-of-open-source
  - Rumors that their business model does not work out
- LON-CAPA becomes CourseWeaver

Lethargy

- Systems which do not have guaranteed vendor support are as good as dead in the US
- Let‘s see what happens to Canvas ...

Lethargy

- That's why we are building another open-source CMS
  - … wait … what?!
- Actually, we just refuse to believe that this cannot work

Lethargy

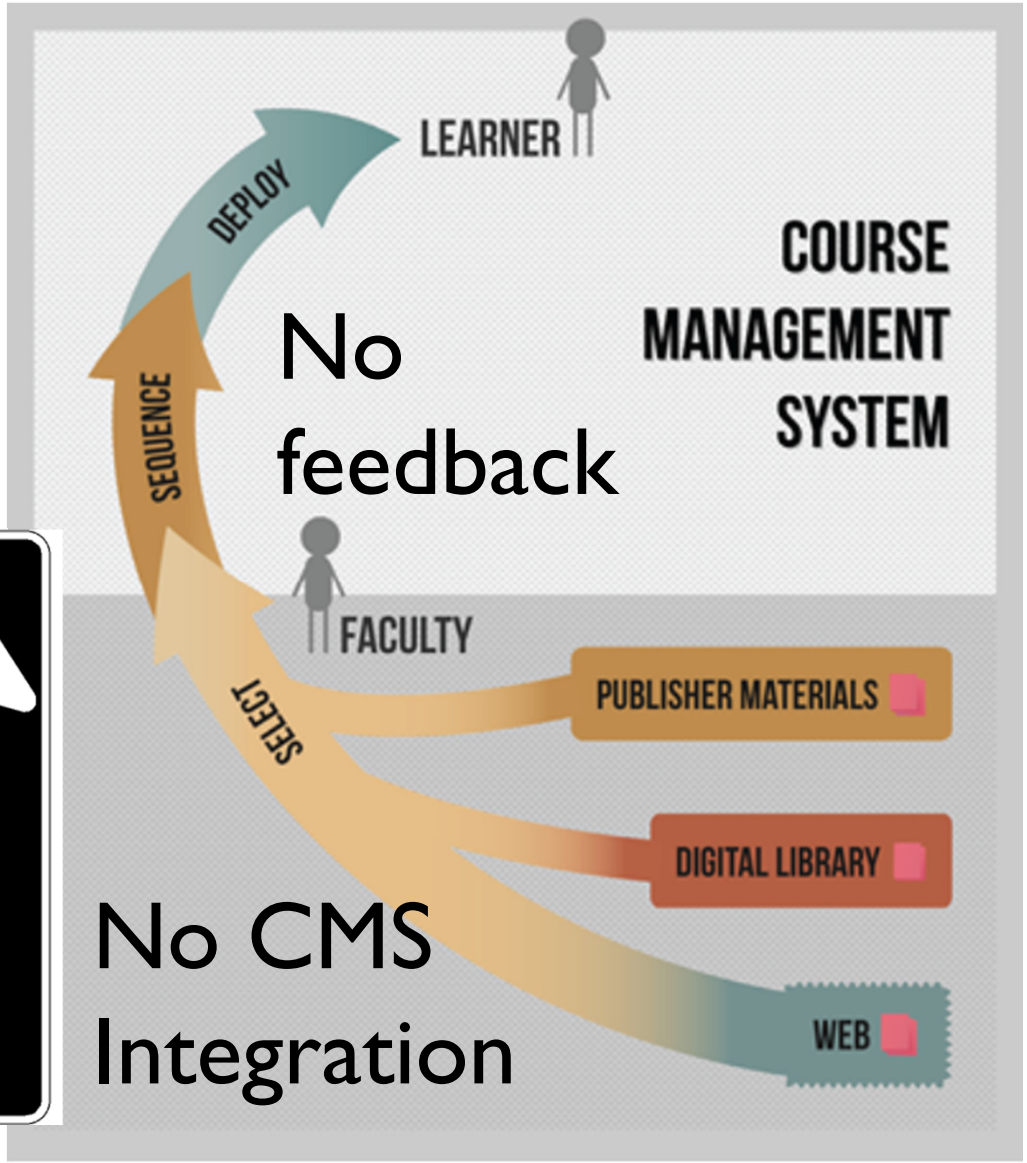
- And Open Educational Resources?
- OERs have not yet had any significant impact on the day-to-day education at American universities

Lethargy

Barriers for adoption:

- Discoverability
- Quality control
- "Last Mile"
- Acquisition

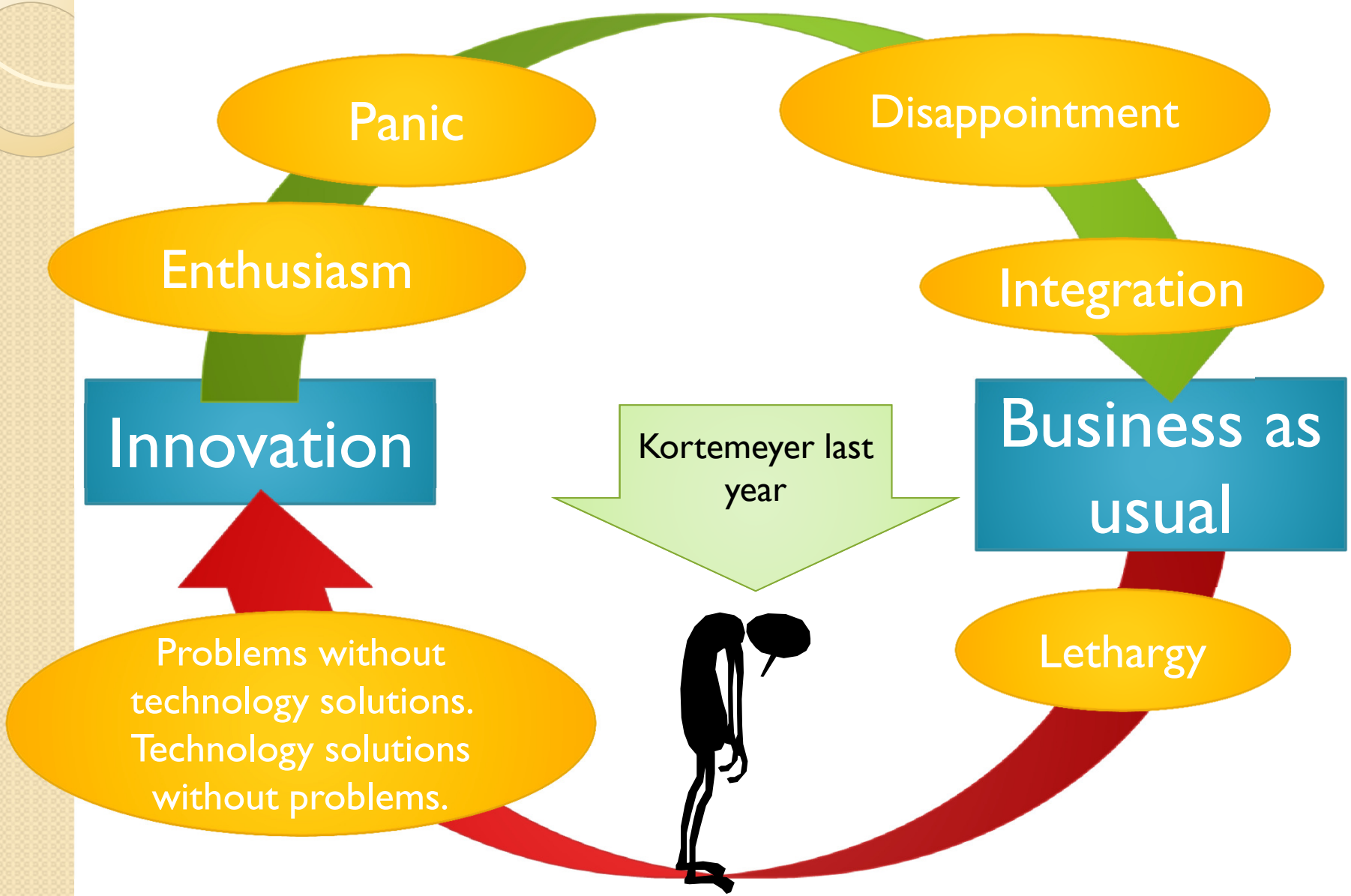
More later (if time)



Lethargy

- OERs are currently (un)dead.

The First Wave – Virtual Universities!

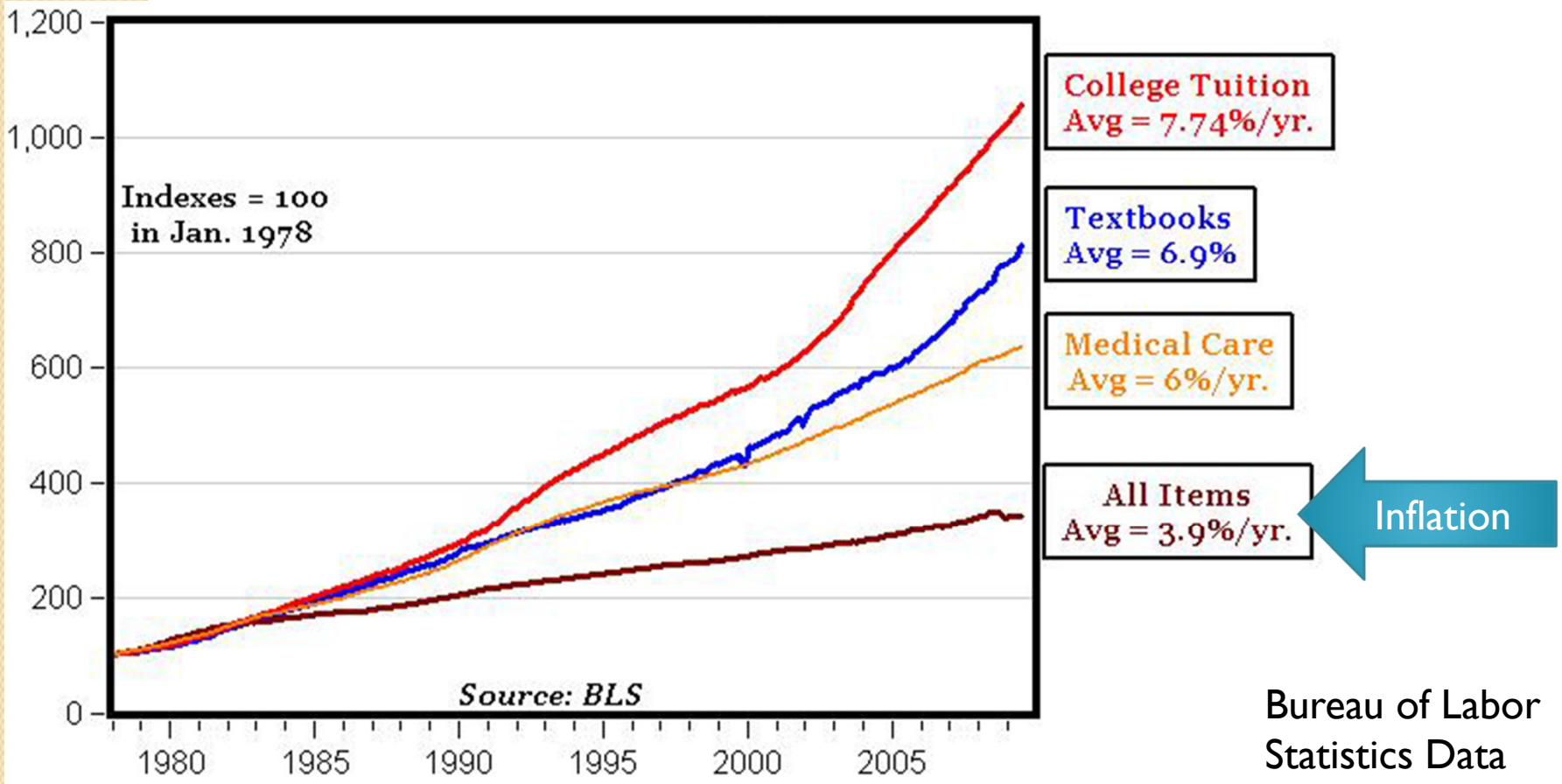


Problems Without Technology Solutions

- Huge tuition increases
  - Higher education becoming unaffortable
- Textbook prices increasing

Problems Without Technology Solutions

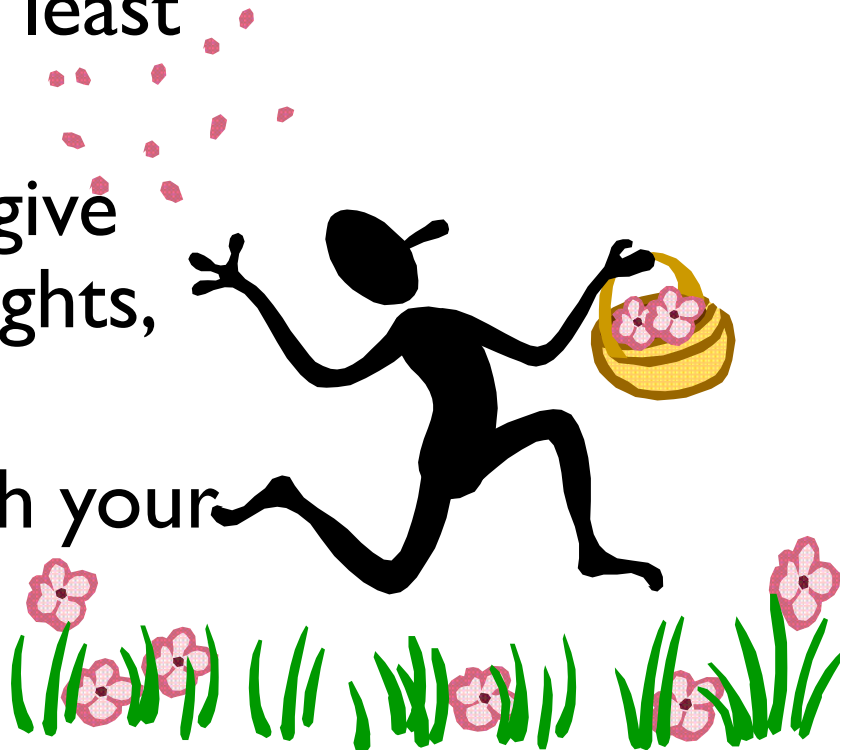
- Tuition and textbooks versus medical care and inflation – how is that for Halloween?



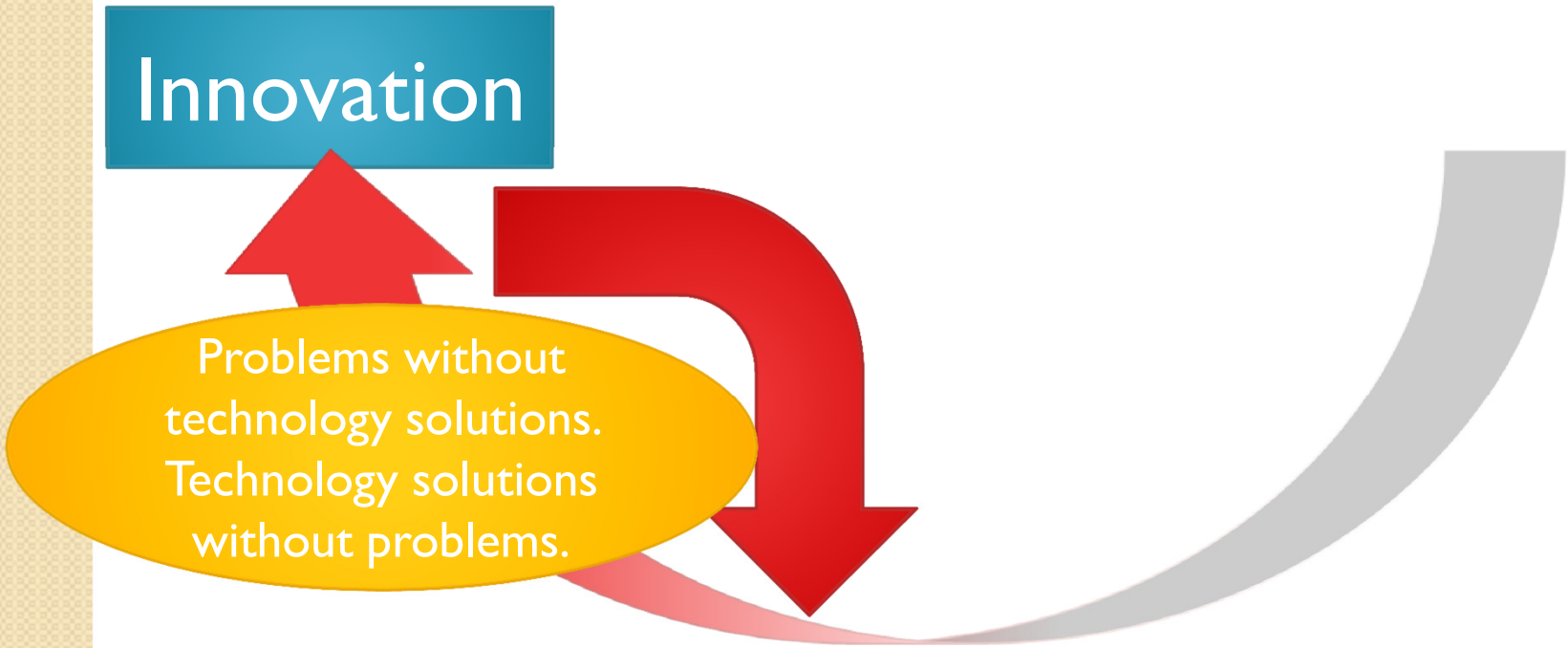
Bureau of Labor Statistics Data

Technology Solutions Without Problems

- Professors like to play with technology
- But no support anymore from university (at least at MSU)
- No willingness to give away intellectual rights, either
- So, what to do with your creativity?



The Second Wave – … maybe not



Second Wave – Step Backwards!

- Welcome to the 21st century!
- eBooks!
- Unfortunately: "Digitizing the dinosaur"
  - PDFs in some restrictive reading environment
  - "Licensed"
  - Overpriced

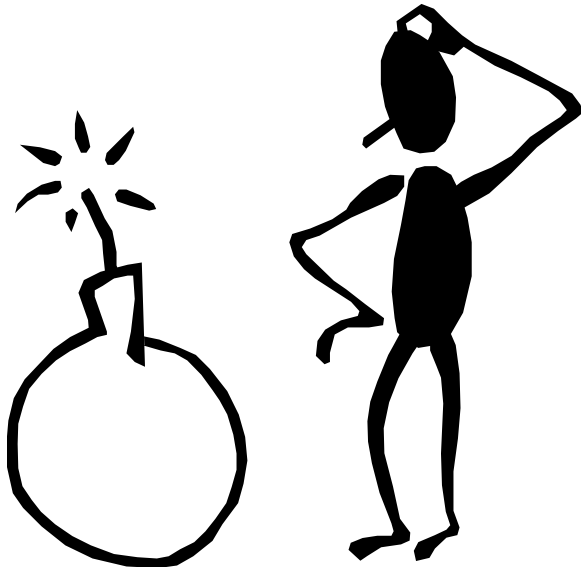
Second Wave – Step Backwards!

- Problems with publisher eBooks:
  - Navigation
  - Static content
  - Platform-dependencies
  - Some cannot be printed
  - Contracts, e.g.:
    - 180-day license
    - IP adress restrictions to USA
  - Not cheaper in the end, since no resale value

Short Summary

So far, everything either

- dead,
- undead,
- close to extinction

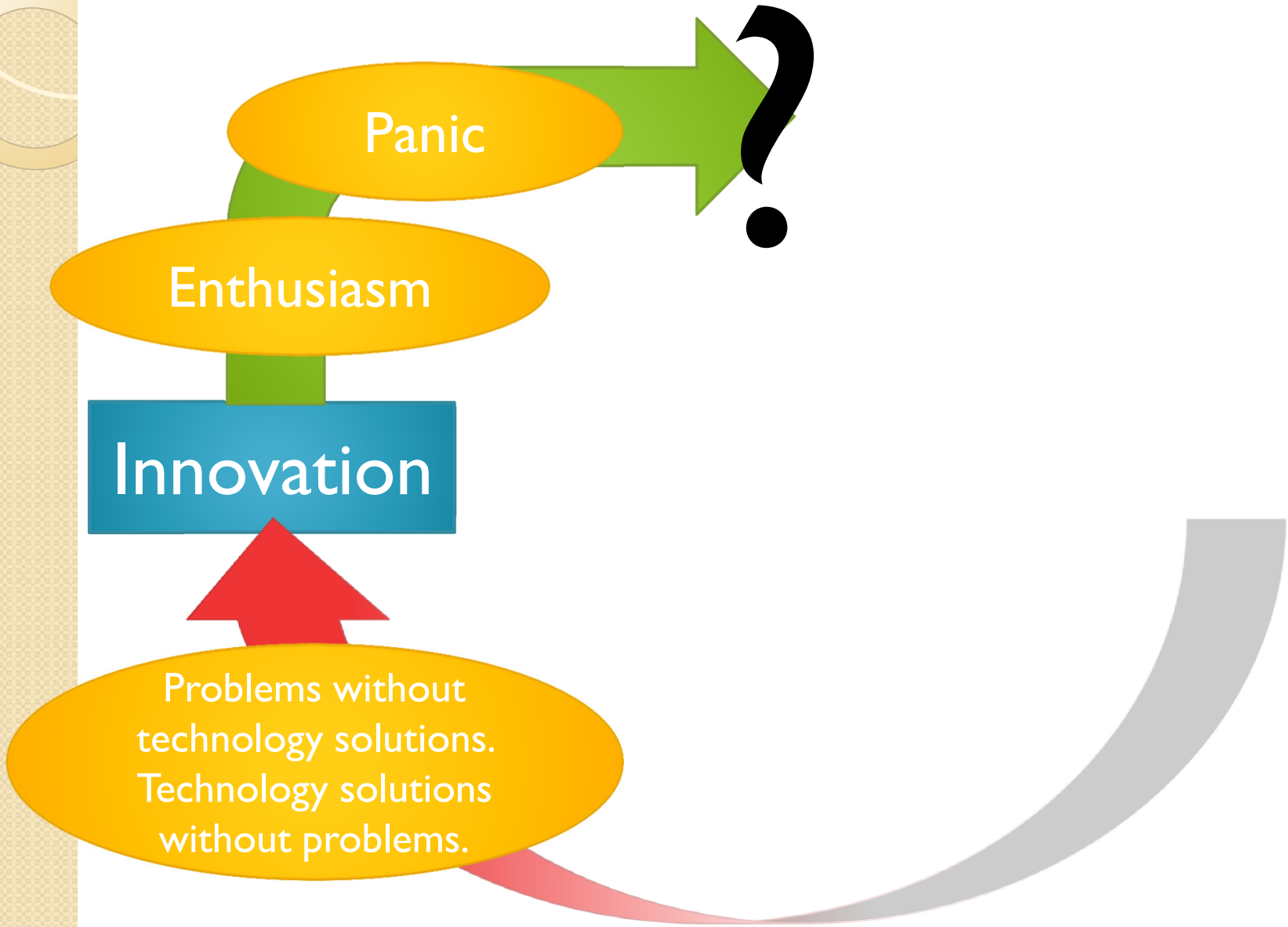


or

- fully and mission-critically integrated into day-to-day business
  - Risk-averse, killing innovation

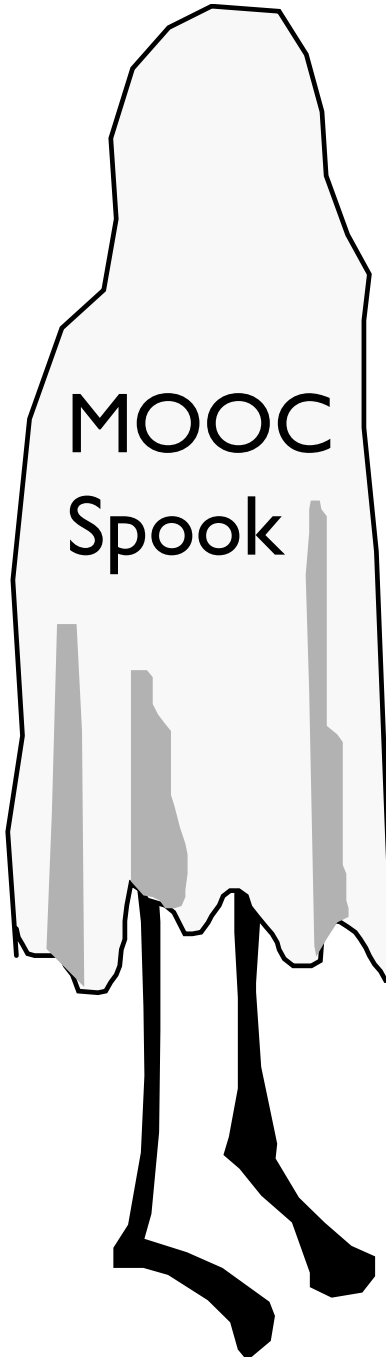
But there are clearly problems!

The Second Wave – OERs and MOOCs



Enthusiasm

- New kid on the block:
  Massive Open Online Courses (MOOCs)
  - Solution for tuition problem?
  - New playground?
- Zombie Revival:
  Open Educational Resources (OERs)
  - Solution for textbook problem?

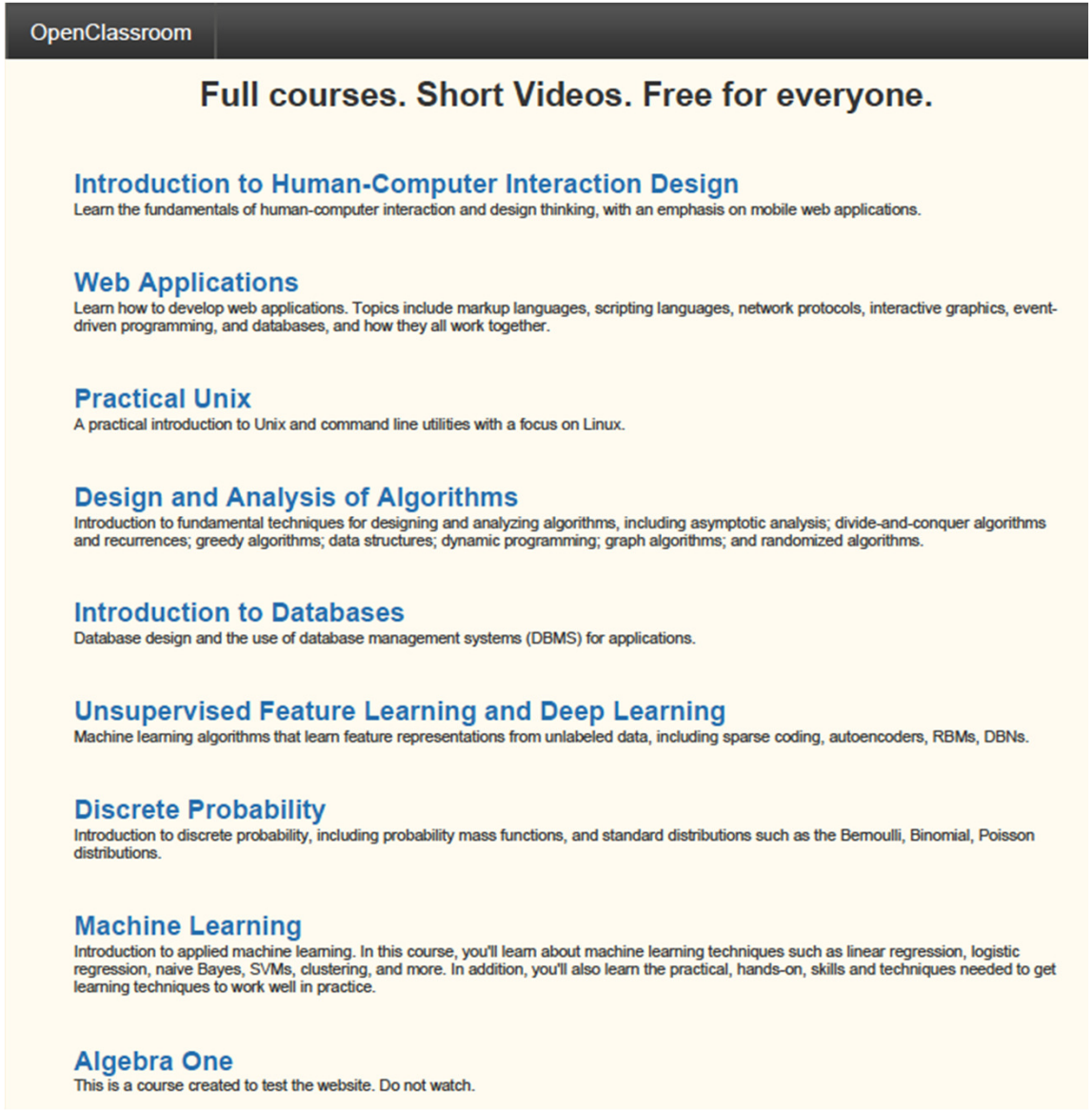


Enthusiasm

- Started with
  Stanford Engineering Everywhere
- Stanford Open Classroom
- Valuable: Stanford degree
- "Worthless:" Knowledge
  - There is no money to be made with the materials, so you might as well give them away.

Enthusiasm

- Short videos, Khan Academy style



Enthusiasm

A number of engineering courses were put online

- without much effort and
- without many educational or didactical considerations

but with

- registration
- homework
- „Statement of Accomplishment“ for regular participation

- The birth of the MOOC

Enthusiasm

- Two courses particularly popular
  - Machine Learning - Andrew Ng
  - Artificial Intelligence – Sebastian Thrun (und Peter Norvig)
- More than 120,000 students
- Both professors ask themselves: is there really no money in 240,000 eyeballs?

Panic: being left behind

UDACITY

- Is there really no money?
- Sebastian Thrun leaves Stanford und starts Udacity
- Invites individual faculty to create MOOCs

ctors

Sebastian Thrun

Sebastian Thrun is a Research Professor of Computer Science

All of AI Class is now available through Udacity along with many other classes! This site (www.ai-class.com) will redirect to www.udacity.com starting in February 2013.

Class has ended, but you can still log in here. Sign in

Panic: being left behind

- Andrew Ng (and Daphne Koller) start Coursera
- While Udacity somewhat positions itself as competition to universities, Coursera tries to attract university partners.

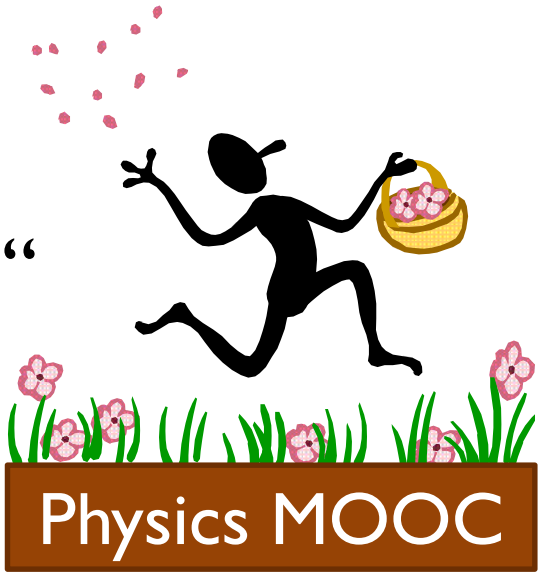
Panic: being left behind

- Udacity and/or (?) Coursera (probably Udacity) contacts MIT professors
- MIT refuses to allow this
  - „Not invented here“
  - Image-conscious
- Professors: “Then give us an alternative!”
- MITx is announced
- At the time of the announcement, MIT had **nothing**
  - … not even on campus
  - Very eclectic mostly traditional environment

New playground!

Panic: being left behind

- While no other tools available, our MIT group builds a MOOC for Advanced Mechanics
- Not yet MITx, implemented in LON-CAPA, based on a course WiKi and old problems
- Since it‘s not official, we cannot call it „MIT MOOC“



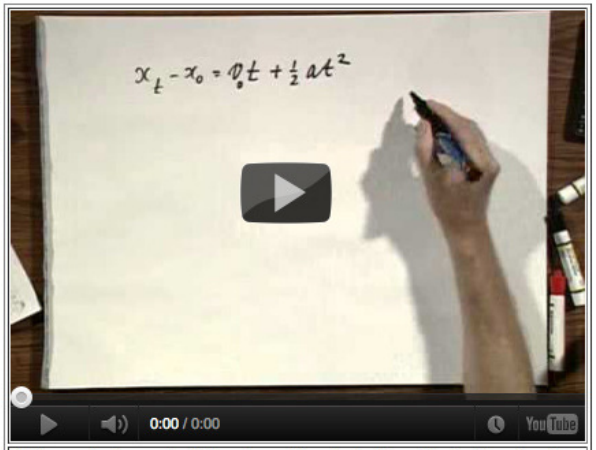
Panic: being left behind

e)Where is the particle at the instance when it is momentarily at rest?

$x =$ **6.6250 m**

Tries 0/7

f)Check out Professor's Walter Lewin's explanation:



This movie is part of the Learning Activities, Help Session 2, in the Module One Dimensional Kinematics and Free Fall, MIT OCW.

Threaded View Chronological View Sorting/Filtering options Export? Preferences on what is marked as NEW Mark NEW posts no longer new

NEW **Units** [redacted] Hide Delete Reply Submissions (Sun Mar 11 09:37:40 pm 2012 (EDT))

The units required are not mentioned in the problem setting, but it's expecting meters and seconds.

NEW **x(0)** [redacted] Hide Delete Reply Submissions (Sun Mar 11 09:43:13 pm 2012 (EDT))

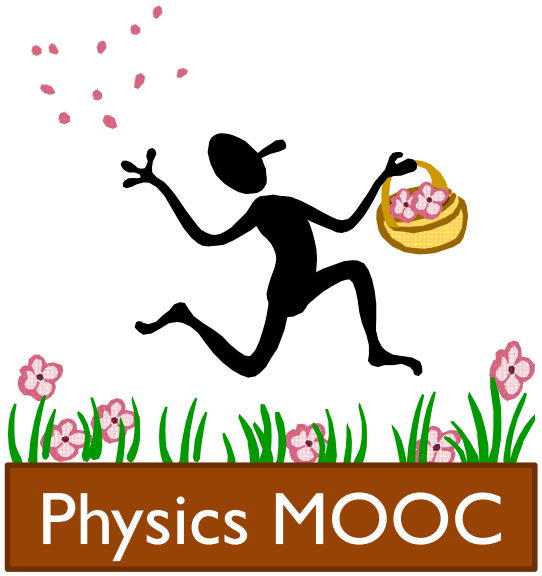
x(0) = 0

NEW [redacted] Hide Delete Reply Submissions (Mon Mar 12 02:17:02 pm 2012 (EDT))

Thanks for the heads-up, Chris. One of the major points that students need to understand in interpreting velocity-time graphs is that they DO NOT convey position information. You can get "displacement", which will tell you how far, and in what direction, an object moves, but if you don't know where it WAS (or any other position info.), you CANNOT determine where it IS.

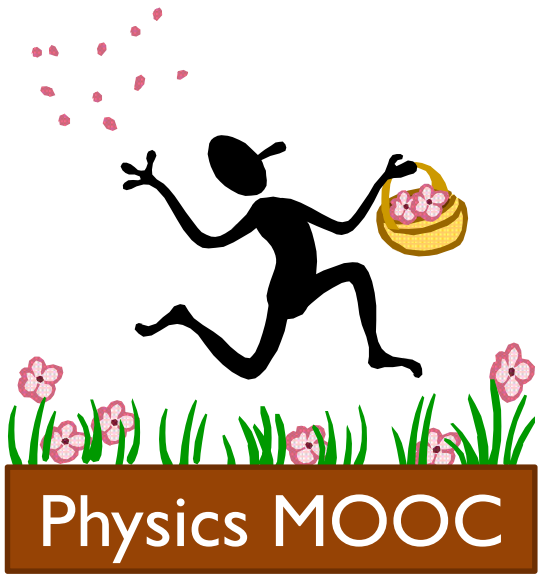
- Pilot Physics MOOC

Integrated text, problems, videos, and discussions



Panic: being left behind

- Physics „Pilot“ MOOC at MIT:
  - 2000 enrollments
  - 200 people participants
  - 20 people finish
- Order-of-magnitude decline apparently normal for MOOCs
- People who successfully finished the course: mainly high school physics teachers



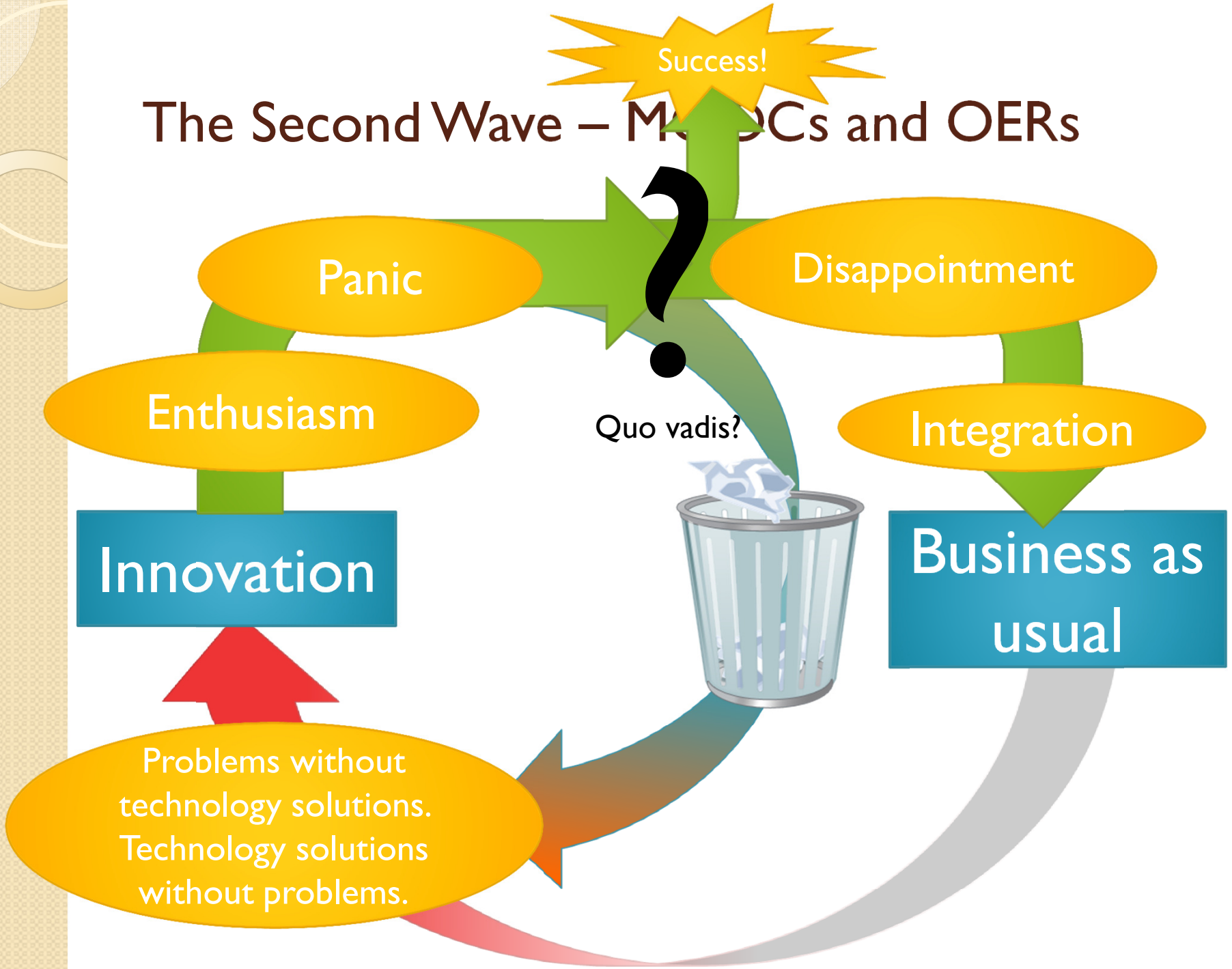
Panic: being left behind

- MITx builds own MOOC platform
  - Not a full-featured Course Management System
- Harvard joins, becomes edX
- True spin-off

Panic: being left behind

- You can follow the daily news in the Chronicle of Higher Education, etc.
- Question:
  what will happen on the long run?

The Second Wave – MOOCs and OERs

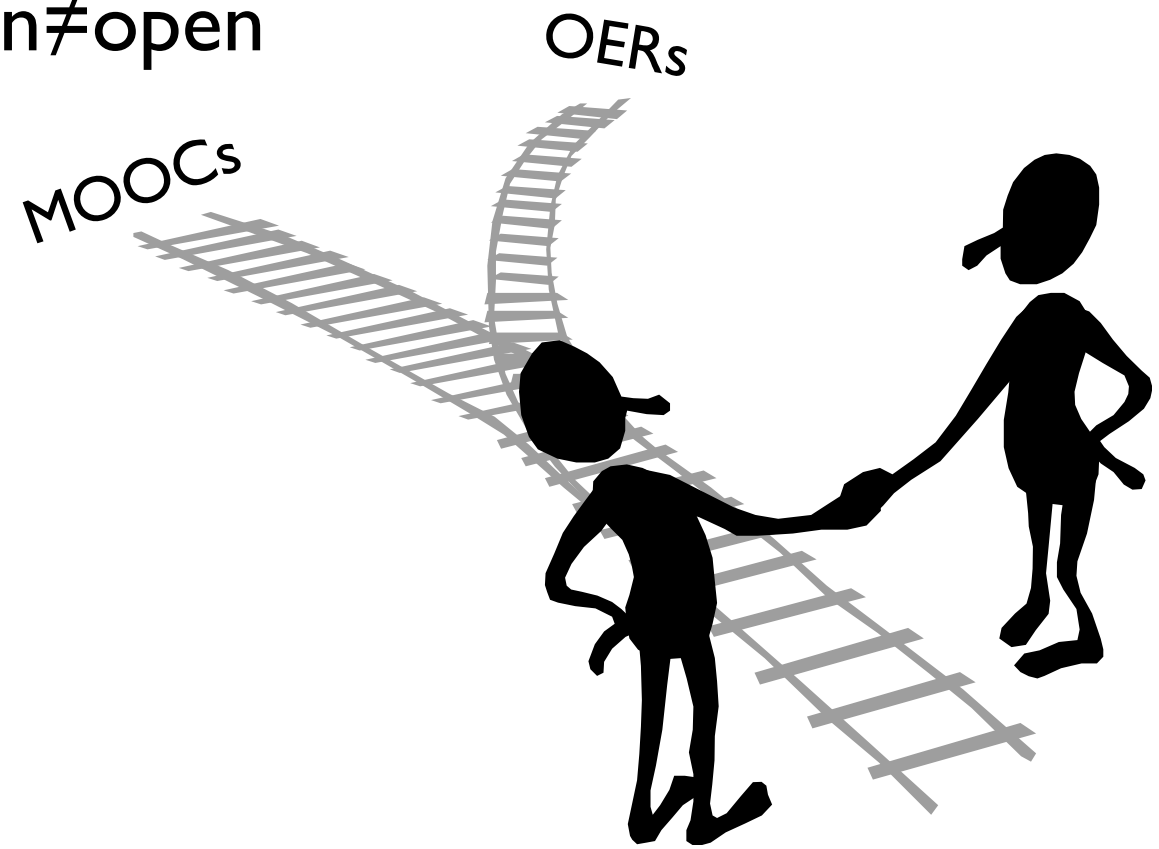


The Second Wave – MOOCs and OERs

- If MOOCs succeed will depend on the business model
- My prediction:
  - Niche market, some courses will be accepted similar to advanced placement as a recruitment tool
  - Certificates (similar to Cisco, etc)
  - Generally making noise as marketing for institutions

The Second Wave – MOOCs and OERs

- Important: M**O**OCs currently do not consist of **O**ERs!
- Open≠open



The Second Wave – MOOCs and OERs

- If OERs will succeed will depend on whether or not proponents will abandon some of the "pure ideology"

The Second Wave – MOOCs and OERs

etc.

- Yes, and those are great, but we are missing the "**last mile:**"
  - Fine-granular content immediately ready for use
  - Aid in selecting and sequencing materials
  - Full integration into the course venue
  - Broken feedback loop

The Second Wave – MOOCs and OERs

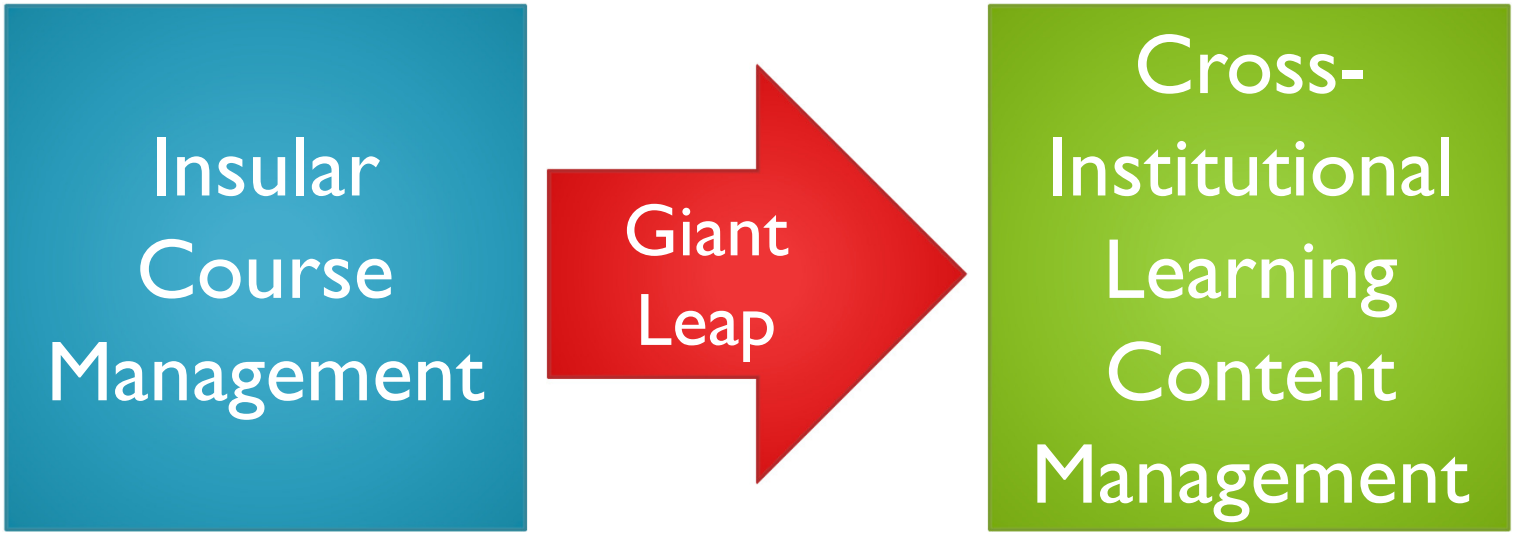
- There is a large amount of electronic educational materials available
- How can these be turned into interactive etexts?
- What is usually missing is a way to:
  - catalog and verify the materials
  - get recommendations
  - sequence the materials
  - integrate the materials into a course
  - embed assessment
  - have associated peer teaching
  - control access to exam-relevant materials

The Second Wave – MOOCs and OERs

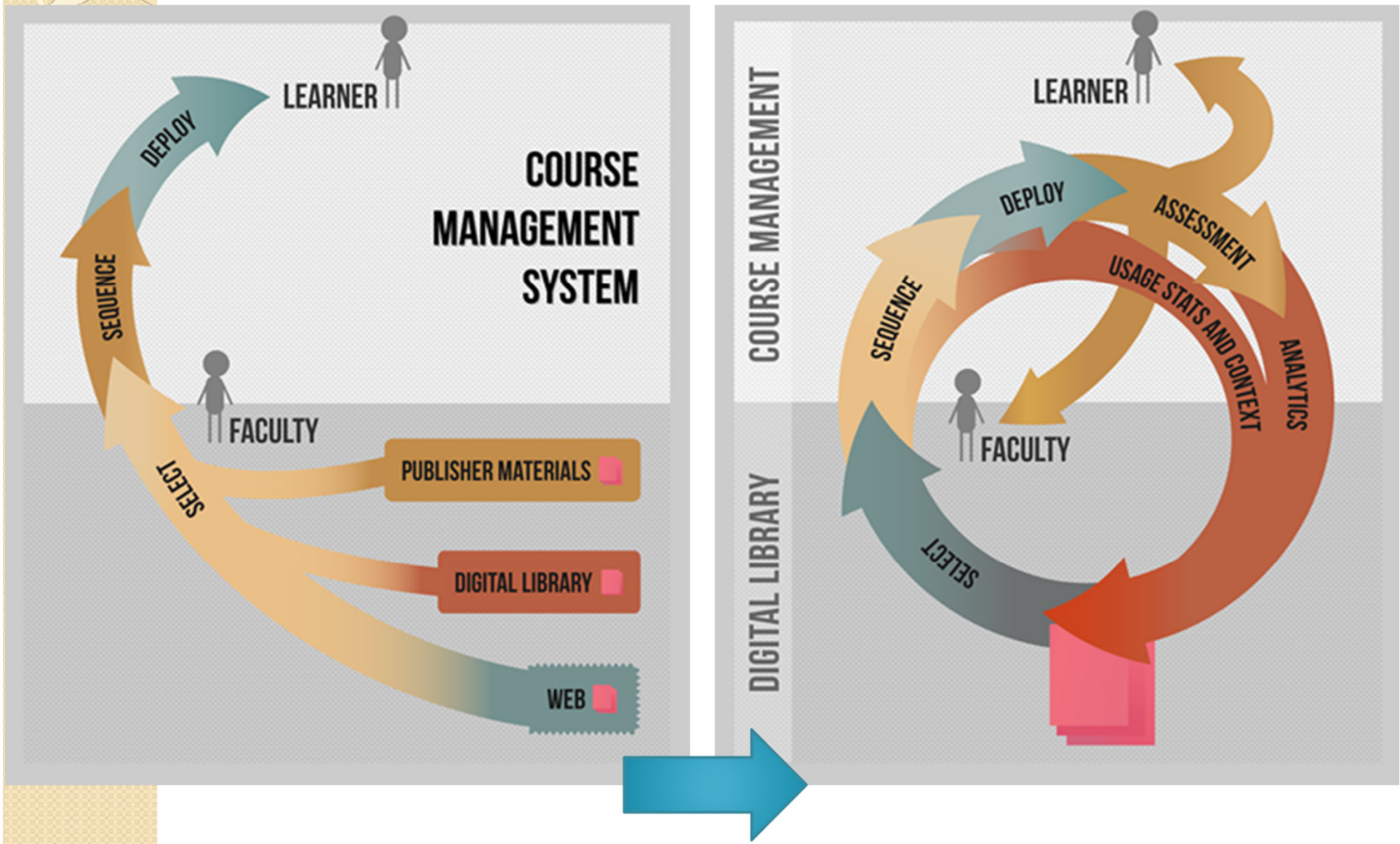
- The big leap:

The Second Wave – MOOCs and OERs

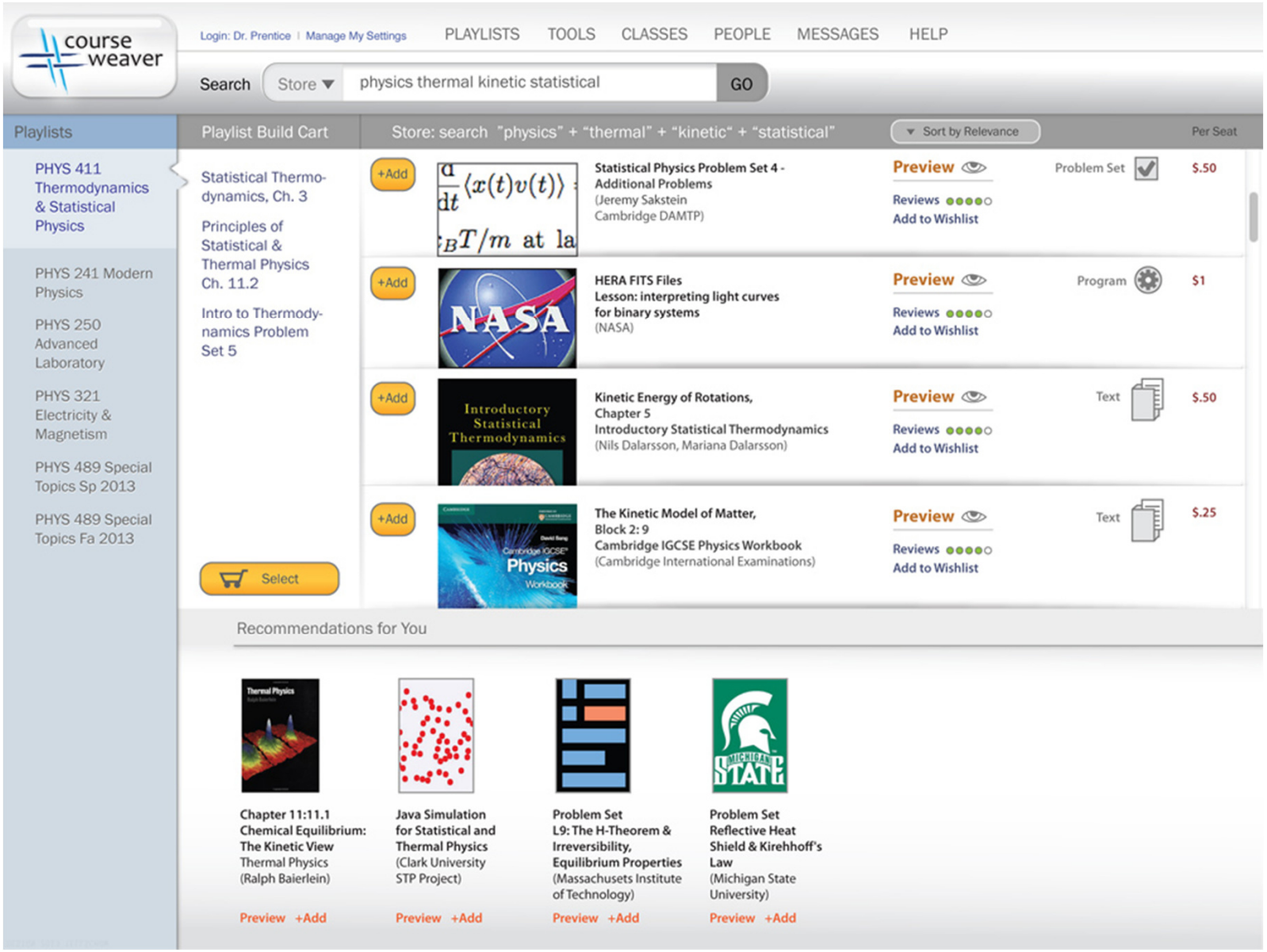
- But one institution alone will not have critical content mass to build a comprehensive portfolio of etexts



The Second Wave – MOOCs and OERs



The Second Wave – MOOCs and OERs



The Second Wave – MOOCs and OERs

- Of course we have **the** solution
- We **guarantee** the success of the second wave

- MSU's next generation of LON-CAPA

Thank you!

Gerd Kortemeyer

Michigan State University

kortemey@msu.edu