



## Tufts' curriculum reform and implications for medical education

University of Tokyo School of Medicine  
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## Where are you in the process of curriculum reform?

- Thinking about change
- Preparing for change
- Managing change
- Reinforcing change

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Please go to:  
[pollev.com/leetufts](http://pollev.com/leetufts)

or

[www.polleverywhere.com/leetufts](http://www.polleverywhere.com/leetufts)

on your smart phone  
or iPad

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## Aims

1. Exchange ideas on health sciences education
2. Contribute to conversation on curriculum change
3. Identify drivers of and barriers to major change
4. Describe the what and how of an integrated medical curriculum
5. Consider next steps for your institution

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## Agenda

- Brief introduction to Tufts University
- What were major drivers of change at Tufts
- Highlights of Tufts integrated curriculum
- Barriers and solutions for change
- Consider your possible next step

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## University of Tokyo



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# Where s Boston?



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- Research intensive university, founded in 1852
- \$1.5 billion endowment
- 10,500 students, 1200 international
- 8 major schools, 4 campuses

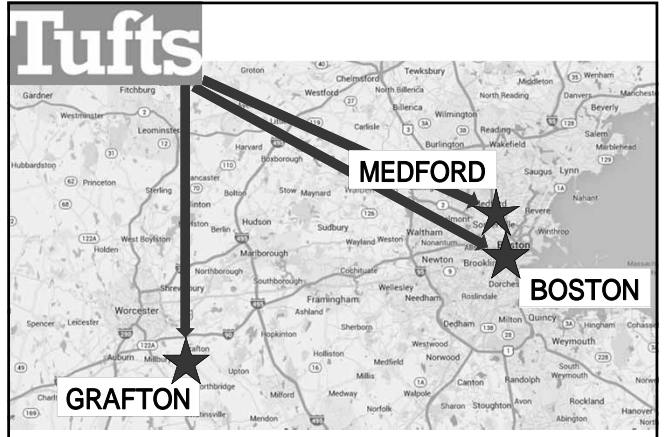
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# Tufts Talloires, France



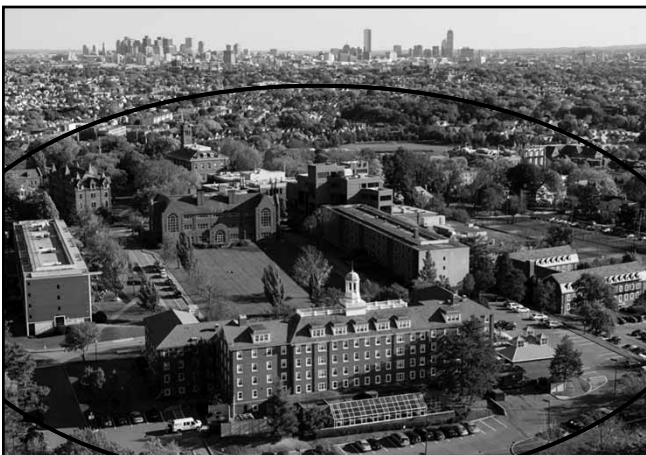
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Boston Dispensary...

Floating Hospital...

Tufts School of Medicine Tufts Medical Center

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What do you think was the major driver of curriculum change at Tufts?

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Clinical Faculty

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Managed Care

- Increased patient panels
- More patients/session
- Productivity markers
- Higher acuity inpatients
- No time for remedial PDx

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## Changes in clinical practice

Images: JFK Library, public domain

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## Changes in Board exams



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## Changes to USMLE Step 3\*

Expanded range of competency-based content:


- Foundational science essential for effective healthcare
- Biostatistics, epidemiology, population health
- Literature interpretation
- Medical ethics
- Patient safety

\*Beginning November 3, 2014

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## Changes in student expectations

- Multiple learning methods
- Flexibility in time allocation
- Meaningful faculty contact
- Early clinical exposure
- Peer learning
- Learning spaces



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## Changes in delivery



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## What s driving change in Japan?


1. Clinical practice/patient care changes
2. External Drivers: accreditation, competition
3. Curriculum/information overload
4. Student expectations
5. Changes in delivery, technology
6. Other

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What changes did  
Tufts make?

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Worked "backwards" from  
clinical performance

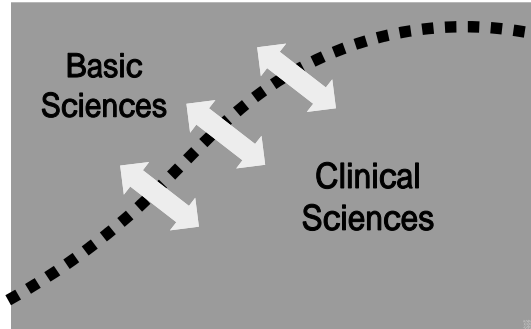


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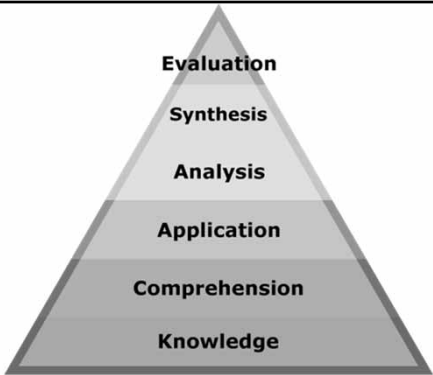
Traditional "2 + 2"

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*Translational* curriculum

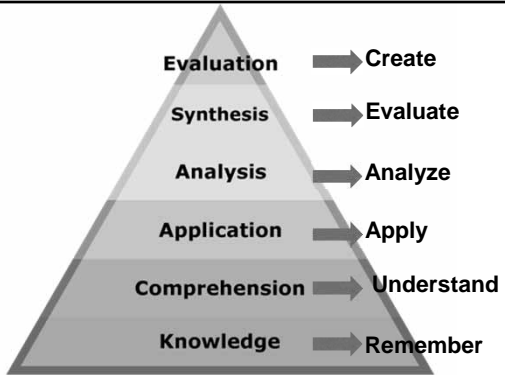
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Original Bloom's Taxonomy

[http://www.learnnc.org/lp/media/misc/2008/blooms\\_old.png](http://www.learnnc.org/lp/media/misc/2008/blooms_old.png)

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Variation of Bloom's Taxonomy

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**CPR FOR ADULTS (AGES 9 AND OVER)**

- 1 Check if someone is unresponsive. Gently tap the person and shout "Are you OK?". If there is no response, shout for help and someone to call 911. If you are alone, call 911 after 30 seconds.
- 2 Open airway. Check for breathing. Look for chest rise and listen for breath sounds. If you see or hear breathing, you do not need to do anything. If you do not see or hear breathing, you need to start CPR.
- 3 If not breathing - Give 2 Rapid breaths (1 second each). Tilt the person's head back and lift the chin. Pinch the nose. Blow into the mouth for 1 second. Watch for chest rise. If you do not see chest rise, repeat the breath. If you do not see chest rise after the second breath, start chest compressions.
- 4 Head position. Place your hands on the center of the chest between the nipples.
- 5 Chest compressions. Place the heel of your hand on the center of the chest. Push hard and fast, at least 2 inches (5 cm) deep. Push at a rate of 100-120 times per minute. Allow the chest to rise completely between compressions. Do not lean on the hands. Push hard and fast for 30 compressions.

→ Create  
→ Evaluate  
→ Analyze  
→ Apply  
→ Understand  
→ Remember

**Taxonomy**

[http://www.learnnc.org/lp/media/misc/2008/blooms\\_old.png](http://www.learnnc.org/lp/media/misc/2008/blooms_old.png)

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Acquire foundational knowledge...

Integrated Course materials

Syllabus Chapter: Cardiovascular

Physiology

Anatomy

Heart sounds

Physical exam

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**CPR FOR ADULTS (AGES 9 AND OVER)**

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→ Create  
→ Evaluate  
→ Analyze  
→ Apply

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Basic Sciences

Clinical Sciences

Construct knowledge  
Integrate concepts  
Apply to patients  
Evaluate/improve

*Translational curriculum*

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Case and problem-based  
Team-based  
Optional lectures  
Flexibility  
Responsibility

Make student-teacher interactions count

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Simulation integral to application and exams

Learn >> Apply >> Learn >> Apply

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comments

00:05:13 - **Jacob Bernack**  
I think this was one of the stronger compassionate moments - verbalizing my empathy and processing what he's sharing in a tone that acknowledges the struggle he's had.

Replies:

00:05:20 - **Robert Kalish**  
Agreed. Empathy can be conveyed with words, expression, gestures among things.

00:05:28 - **Jacob Bernack**  
I think I could have expressed more compassion or spontaneous enthusiasm for the good result he had here, rather than so swiftly moving on to a new line of questions. In general, in terms of compassionate care, I think this would be a good place to...

Getting feedback when working with real patients

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Attitudes  
Professionalism  
Ethics

- Create
- Evaluate
- Analyze
- Apply
- Understand
- Remember

Variation of Bloom's Taxonomy

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1890

PATIENT-CENTERED  
COMMUNITY AND PUBLIC HEALTH  
DYNAMIC LEARNING ENVIRONMENT  
DIVERSITY AND INCLUSION

ACTIVE CITIZENSHIP  
EXCELLENCE AND INNOVATION

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Tufts White Coat Ceremony

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**Basic Sciences**

Construct knowledge  
Integrate concepts  
Apply to patients  
Evaluate/improve

**Clinical Sciences**

Foundational science  
Biostat, epi, pop health  
Literature interpretation  
Medical ethics  
Patient safety

**Translational curriculum**

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### Redesigning space

- Used interactive teaching strategies even with traditional space
- Renovated space incrementally
- Repurposed current space, e.g., created SG rooms from library stack areas
- Focused on team, interactive spaces

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Questions about Tufts'  
overall curriculum  
design?

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## Translational curriculum +/- Small Groups

- Build/integrate content across all 4 years
- Increase student responsibility, eg, no lectures
- Stress understanding concepts and principles
- Require active problem solving, application
- Use faculty for difficult concepts, problem solving
- Evaluate and analyze progress to spur improvements

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What was most relevant  
from your small group  
discussion?

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What technology enabled  
Tufts to support major  
change?

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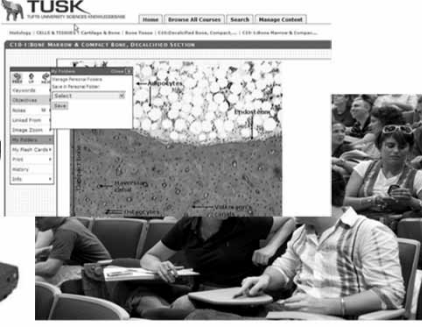


National Library of Medicine digital  
imaging project

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**160 students learning histology**

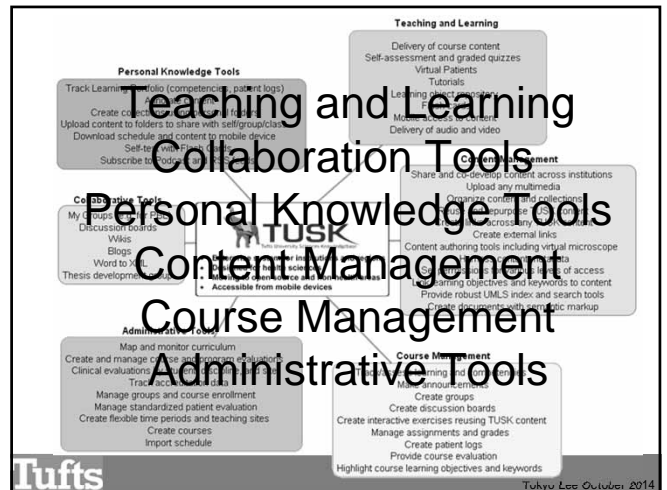
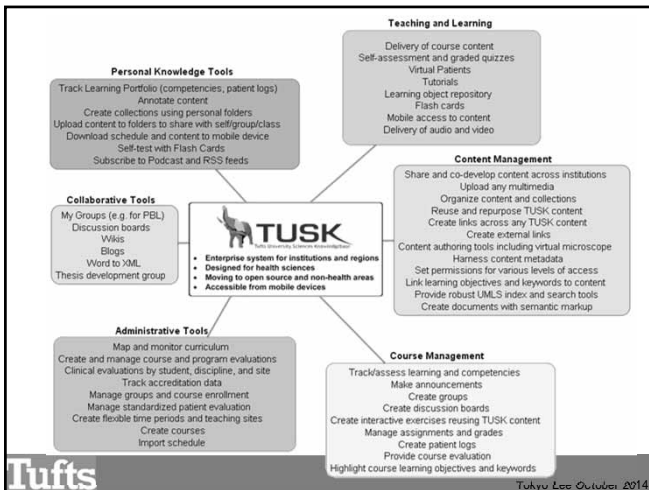
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## What is TUSK

Tufts University Sciences Knowledgebase

- Open source software for health sciences
- Available for any institution to use
- Built on open source MySQL, Apache, etc.
- Add your own content, easy to share
- Was used to create Tufts OpenCourseWare

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## From the student view...

Course materials for Clinical Skills – Year 1

Physiology Year 1


Complete access from anywhere, anytime, at own pace

Anatomy Year 1

Faculty-authored

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## Personal folders organization



Personalize materials across 4 years

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### Virtual patients: case of the week

**E-Learning Case Simulator**

Case Overview  
Learning fractures [Expand Panel]

Phases  
Learning fractures  
Diagnostic Studies  
Diagnosis [Minimize Panel]

Patient Chart

My Notepad  
Make notes for this patient care.

Cost  
View the cost associated for this patient care.

Pic 1  
Image Zoom

Pic 2  
Image Zoom

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### Mobile checklists

TUASK Mobile

Assess Self

Competency Category

SELF ASSESSMENT

ROOKING PATIENTS

Rooming Patients

YES NO

Rooming Patients

YES NO

Submit Card Save Card

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### From the faculty view...

Course materials for Clinical Skills – Year 1

Syllabus Chapter: Cardiovascular

Physiology Year 1

Anatomy Year 1

Commercial animation

Faculty-authored video

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### Slide collections

TUSK Mobile - Epithelium A3: Simple Columnar

TUSK Mobile - Epithelium A3: Simple Columnar

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### Flash cards

Question

Answer

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### Reuse content across three schools

A1-1-DNA

Nucleus

Feulgen Rxn

Linked Documents

Linked Documents

Linked Documents

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**Basic Sciences**

- Foundational science
- Biostat, epi, pop health
- Literature interpretation
- Medical ethics
- Patient safety

**Clinical Sciences**

- Construct knowledge
- Integrate concepts
- Apply to patients
- Evaluate/improve

**Translational curriculum**

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## Assessing online

- Flexible question formats, multimedia
- Timed or not (e.g., prior to a lecture or lab)
- Feedback options
- Links to content, video performance, checklists
- Quiz item analysis

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## Link school to national competencies

the USMLE Step 1 Examination.

Item	Domain
1. Graduates will understand the biological sciences underlying clinical medicine. Supporting Information	Supporting Information
2. Students will apply the biological sciences to the practice of medicine by...	Supporting Information
3. A) Stating the scientific basis for disease and the role of translational research.	Competency
3. B) Explaining the principles of genetic transmission, the molecular biology of the human genome, the integration of genetics in clinical practice and the molecular, cellular, and biochemical mechanisms that maintain the body's homeostasis	Competency
3. C) Describing the normal structure and function of each major organ system and the human body as an intact organism.	Competency

**AACMC ASSOCIATION OF AMERICAN MEDICAL COLLEGES**

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## TUSK's Mission:

To create and share software and content to enhance teaching and learning in the health sciences.

For more information please visit: [www.opentusk.org](http://www.opentusk.org)

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**TUSK**  
Tufts University Sciences Knowledgebase

**See: Opentusk.org**

<b>USA</b>	<b>Africa</b>	<b>Southeast Asia</b>
Albert Einstein	Uganda	India:
U. Arizona	DRC	CMC Vellore
Emory	Kenya	Bangalore
U. Hawaii	Tanzania	Thailand
New York Medical College	Ghana	
Tufts (Med, Dental, Vet, Grad Biological Sciences)	Ethiopia	<b>Middle East</b>
	Rwanda	Saudi Arabia

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## Questions about TUSK

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## Barriers

1. Lack of leadership support
2. Lack of funding
3. Faculty resistance
4. Student resistance
5. Inappropriate space
6. Inadequate technology, software, trainers

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What do you see as the major barriers for curricular change and integration of technology?

Small Groups

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Let's look at some possible solutions

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## Incentives for leadership

1. Align with school/university strategic plan
2. Support clinical care, GME, e.g., QOC
3. Further departmental goals for research
4. Leverage faculty time
5. Meet/exceed accreditation requirements

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## Ways to fund

1. Align with components of strategic plan
2. Create an intramural grant program
3. Leverage intramural for extramural grants
4. Enhance existing projects
5. Design incremental projects >> Pilots!

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## Addressing faculty resistance

1. Keep ultimate goals (for faculty and students) in mind
2. Help faculty solve *their* problems
3. Find key champions and early adopters
4. Win over key naysayers
5. Need trainers who work well with faculty

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## Addressing student resistance

1. Use program assessment and focus groups
2. Engage students in design/implementation
3. Update students on plans and progress
4. Be clear and reasonable about expectations
5. Provide flexible, effective teaching methods

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## IT resources

1. Standards are always evolving
2. Decide what is central vs. local
3. Choose open source vs. proprietary
4. Criteria for staffing
5. Technology tools, hardware, software, labs

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Engage students, faculty and staff in all phases of curriculum reform

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## What is gained?



Habits of lifelong learning, competency  
 Deeper relationships with peers and faculty  
 Greater student and faculty engagement  
 Ease of revision across programs  
 Continuous improvement

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## Aims

1. Exchange ideas on health sciences education
2. Contribute to conversation on curriculum change
3. Identify drivers of and barriers to major change
4. Describe the what and how of an integrated medical curriculum
- 5. Consider next steps for your institution**

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## What s your next step?


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*Thank you!*

*Questions?*

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