

Undergraduate Education in the United States

John Hopcroft

Cornell University

Ithaca, NY

Shanghai Jiao Tong University

Shanghai

Nov. 14 2014

Shanghai Jiao Tong University

1

Outline of talk

- Factors affecting education at US universities
- Some observations on China

Nov. 14 2014

Shanghai Jiao Tong University

2

US culture

- Faculty believe in undergraduate education and will not accept faculty who don't.
- Most important aspect of a faculty member's teaching is whether he or she cares about the success of his or her students.
- Each faculty member determines his or her research area. If you are going to do world class research it needs to be research that you believe in.

Nov. 14 2014

Shanghai Jiao Tong University

3

Junior faculty development

- Courses for a junior faculty member are initially small and in the faculty members research area.
- Before tenure at least one large elementary course.
- Experienced senior faculty expected to teach the large important courses.

Nov. 14 2014

Shanghai Jiao Tong University

4

Typical faculty teaching load

- One course per semester.
- One semester teach an undergraduate course in your area but a fairly large course. This is viewed as service to department.
- The other semester teach a graduate course in your specialty. Maybe eight to ten students. This course is for your professional development.

Nov. 14 2014

Shanghai Jiao Tong University

5

Teaching Evaluation

- Undergraduate student course evaluations identify outstanding teachers and very weak teachers but little else.
- Not good indicators otherwise.
- Too many other factors influence evaluations
 - Level of course
 - Required course
 - Many other factors

Nov. 14 2014

Shanghai Jiao Tong University

6

Teaching Evaluation

- Senior faculty member sitting in.
- Better to have senior faculty co-teaching the course.
- Talk about key ideas and how they get covered.

Nov. 14 2014

Shanghai Jiao Tong University

7

Questions good faculty ask themselves

- Why did the students not grasp an idea that I covered?
- How can I get the idea across better?
- What are the important ideas in today's lecture?

Nov. 14 2014

Shanghai Jiao Tong University

8

Blackboard versus Power point

- If during a lecture you realize students are not understanding, with a blackboard lecture you can revise the lecture.
- The lecture can be tailored to students as you give it.
- Powerpoint you are stuck with what you prepared.

Nov. 14 2014

Shanghai Jiao Tong University

9

Admission of students

- Students are admitted to a college not a department.
- There is a common curriculum for the first year.
- Students select their major sometime during the first year after they see various possibilities.
- Student can change their college or major if they change their minds.

Nov. 14 2014

Shanghai Jiao Tong University

10

Institutions are independent

- Institutions can experiment.
- What works at one institution is adopted by other institutions.
- Institutions try to move top faculty from other institutions.
- This adjusts compensation to the quality of the individual.

Nov. 14 2014

Shanghai Jiao Tong University

11

Little bureaucracy

- Creating a new course.
15 minute discussion with department chair
- Email to administrator to get course listed.

Nov. 14 2014

Shanghai Jiao Tong University

12

Conflict of interest policies

- Must act in students best interest.
- Cannot employ students in a company in which you have a financial interest.
- Must fill out a conflict of interest form each year.
 - Must disclose any financial interest in an organization that does business with your institution.
 - A conflict of interest is not wrong but how you handle it is important.

Nov. 14 2014

Shanghai Jiao Tong University

13

Teaching students

- Most important factor in teaching is caring about your students success.
- Understand your student's current level of knowledge and present material to build on that level.
- Encourage students to ask questions.
- Engage students outside of class in research at a level that is appropriate for their current educational level.

Nov. 14 2014

Shanghai Jiao Tong University

14

Teaching students

- Curriculum should have room for students to select some elective courses in areas that they enjoy.
- Different students have different goals in life.
- Some just want a technical education that will get them a good job.
- Others want to learn material so they can become researchers and faculty.

Nov. 14 2014

Shanghai Jiao Tong University

15

Why science in universities?

- The US science policy funds basic science in universities in order to insure a next generation of scientists.
 - Not to get the science done, but to make sure there will be a next generation of scientists.
- Science is divided into basic and applied. Both can be very fundamental.
 - Basic – science selected by research investigator.
 - Carried out in universities
 - Applied – science necessary for some national need.
 - Carried out in government laboratories

Nov. 14 2014

Shanghai Jiao Tong University

16

Research funding

- Depends on track record of PI and quality of proposal.
- When grant is funded you do not need to do the work proposed if you decide something else is more important.
- Research programs are audited.

Nov. 14 2014

Shanghai Jiao Tong University

17

Some Observations on education in Asia

Nov. 14 2014

Shanghai Jiao Tong University

18

Some needed changes in Asia

- Stop counting number of publications.
- Concentrate on doing high quality research and publish only when significant work has been achieved.
- Stop counting research funding obtained.
- A faculty member should only seek funding and be evaluated on whether he/she brings in funding appropriate for the type of research he/she is doing.

Nov. 14 2014

Shanghai Jiao Tong University

19

- When I was hired as an assistant professor at Princeton my first publication had not yet appeared in print.
- When I became a full professor I had 10 publications.
- Today some PhD candidates have 10 publications.

Nov. 14 2014

Shanghai Jiao Tong University

20

- Move to subjective standards.
 - Ask leading international researchers in a persons subarea what has he or she done, why is it important, and how has it impacted the work of others.
 - Need fair way to select those asked.
- More emphasis on evaluation of teaching.
- Leadership in recruiting top faculty and improving the department.

Nov. 14 2014

Shanghai Jiao Tong University

21

- Student should be admitted to university and only after they are there for a year select their major.
- For students to do world class research, they need to be involved in a project that they believe in and are excited about. Not a project that their advisor tells them to work on.

Nov. 14 2014

Shanghai Jiao Tong University

22

Issues in China

- Universities ranked by research funding and number of publications.
- Poor development of junior faculty.
 - Not a high concern of department chairs or administration.
 - Junior faculty often have no PhD students
 - Many junior faculty work on what senior faculty want. Not what excites them.
 - Not evaluated on teaching or professional reputation.

Nov. 14 2014

Shanghai Jiao Tong University

23

Drivers of world class research

- A faculty member needs to work on what he or she believes in.
- They need to be free to work several years on a project without pressure to publish or get research funding.

Nov. 14 2014

Shanghai Jiao Tong University

24

Evaluation of teaching

- Evaluation of faculty
- Evaluation of dean's and department chair's support of teaching
- Evaluation of universities teaching quality

Nov. 14 2014

Shanghai Jiao Tong University

25

Evaluation of faculty

- Student evaluations
 - Can identify outstanding teaching and very poor teaching but not good measure.
 - Too many factors influence teaching evaluations
 - Required class or elective
 - Level of class, advanced or freshman year
- Evaluation of a lecture by independent expert
 - Need to develop items to look at
 - Has faculty member engaged the students?
 - Is faculty member well prepared?
 - Are ideas clearly presented?
- Evaluation of course description
 - Each course a faculty member teaches should have documentation as to what is covered.
 - Is course up to date?
- Ask for documentation
 - What are key intellectual ideas that are covered
 - How is some idea covered?

Nov. 14 2014

Shanghai Jiao Tong University

26

Evaluation of dean's and department chair's support of teaching

- How good is faculty teaching in unit?
- How well are good teachers compensated?
- What efforts are deans and department chairs doing to improve teaching in their unit?

Nov. 14 2014

Shanghai Jiao Tong University

27

Evaluation of universities teaching quality

- Do presidents have a commitment to quality teaching?
- How does university teaching compare to other similarly ranked universities?
- This is an important issue for the Ministry of Education. Resources to universities should depend on quality of education.

Nov. 14 2014

Shanghai Jiao Tong University

28

Faculty development

- Teaching assignment
 - One course per semester
 - One semester an undergraduate course in faculty member's area (service to department)
 - Other semester a graduate or advanced undergraduate course (faculty members professional development)
- Supervision of high quality PhD's
 - Most important factor in faculty member's development is quality of PhD's
- The development of junior faculty is important for the future of the university

Nov. 14 2014

Shanghai Jiao Tong University

29

Research funding

- Funding needs to be based on quality of proposal and track record of principal investigator.
- Not on who you know.

Nov. 14 2014

Shanghai Jiao Tong University

30

- Need to increase living standard for junior faculty.
- Also need to increase living standard for PhD students.

Nov. 14 2014

Shanghai Jiao Tong University

31

- A number of universities in China are moving from a contract system to a tenure system.
- One university claims they will reduce the size of their faculty by two and double salaries of remaining faculty.
- Need to have a strategic plan on how this will be done.

Nov. 14 2014

Shanghai Jiao Tong University

32

Talent is uniformly distributed throughout the world but opportunity is not

- Asian nations need to focus on improving education if they are to become the leading world nations.
- Ultimately in the information age, the standard of level will depend on quality of education.
- Each nation should have a well thought out strategic plan to improve education.

Nov. 14 2014

Shanghai Jiao Tong University

33

Thank you for this opportunity to provide my views on education.

Nov. 14 2014

Shanghai Jiao Tong University

34