TEACHING AND RESEARCH: INSEPARABLE RESPONSIBILITIES OF THE MODERN PHYSICIST

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We have a problem
We have a problem

Why?
Outline

- We have a problem
- Why?
- So what should we do?
We have a problem

380,000 students take introductory physics each year...

We have a problem

about 1% of these get a bachelor’s degree in physics

We have a problem

Of the 4,300 students with a bachelor’s degree in physics...
We have a problem

about 35% go on to get a Ph.D. in physics...

We have a problem

That’s one out of every 260 students in our introductory courses!
We have a problem

What about the other 259...?
We have a problem

What do we know about these students?
We have a problem

They know the jargon:

- circular motion
- barometric pressure
- light radius
- something to the power times ten to the something
We have a problem

They are aware of their lack of knowledge

- I graduated from college but I didn’t study *astronomy*
- It’s been a while since I’ve had physics
They are aware of their lack of knowledge

- I graduated from college but I didn’t study *astronomy*
- It’s been a while since I’ve had physics

...and they don’t care!
We have a problem

Should we worry?
We have a problem

We’d better!
"I took four years of science and four years of math...

A waste of my time, a waste of the teacher’s time, and a waste of space...

You know, I took physics.

For what?"
Why do we have this problem?
Why do we have this problem?

What are our three most important objectives?
Why do we have this problem?

What are our three most important objectives?

- excellence in research

*APS CoE Report* (1992)
What are our three most important objectives?

- excellence in research
- excellence in teaching

APS CoE Report (1992)
Why do we have this problem?

What are our three most important objectives?

- excellence in research
- excellence in teaching
- education of graduate students

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Why do we have this problem?

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- education of graduate students
- education of undergraduates

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- excellence in teaching
- education of graduate students
- education of undergraduates
- education of non-majors

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Why do we have this problem?

What are our three most important objectives?

- excellence in research
- excellence in teaching
- education of graduate students
- education of undergraduates
- education of non-majors
- outreach

APS CoE Report (1992)
Why do we have this problem?

What are our three most important objectives?

- research excellence
- graduate education
- teaching excellence
- undergraduate education
- non-major education
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Ph.D.

masters

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APS CoE Report (1992)
Why do we have this problem?

What are our three most important objectives?

research excellence
graduate education
teaching excellence
undergraduate education
non-major education
outreach

Ph.D. masters bachelors

APS CoE Report (1992)
So what should we do?
A path to the future

Let’s not forget the base of the pyramid!
Good strategies exist — let’s implement them!
So what should we do?

Suggestions:

- evaluate
- reach out to public
- don’t (re)invent, *implement*!
- community wide involvement
So what should we do?

Challenges:

- internal skepticism
So what should we do?

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- growing pains
So what should we do?

Challenges:

- internal skepticism
- growing pains
- limited circle of influence
Summary

- Need: demonstrate value of physics
- Opportunity: education and outreach
- Strategy: discipline-wide collaboration
Funding

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For a copy of this talk and additional information:

http://mazur-www.harvard.edu