

*J*ournal of
*E*ngineering
*E*ducation



THE RESEARCH
JOURNAL FOR
ENGINEERING
EDUCATION



Advancing Engineering Education Research Worldwide

Opportunities to
Publish and Participate

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Overview

1

A fundamental shift

Reform to research; an emerging discipline

2

Building a community of scholars

Role of journals; transformation of JEE

3

Engaging more faculty

Observations; suggestions

A more scholarly approach

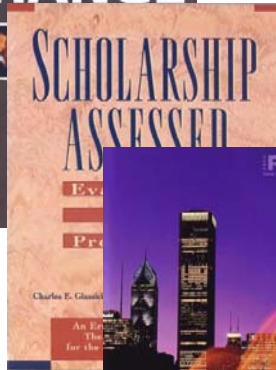
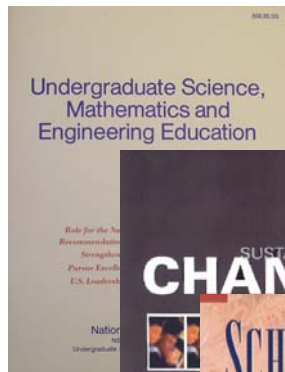
Two decades of debate

- NSF: 1986 “Neal Report”

- ABET: EC2000

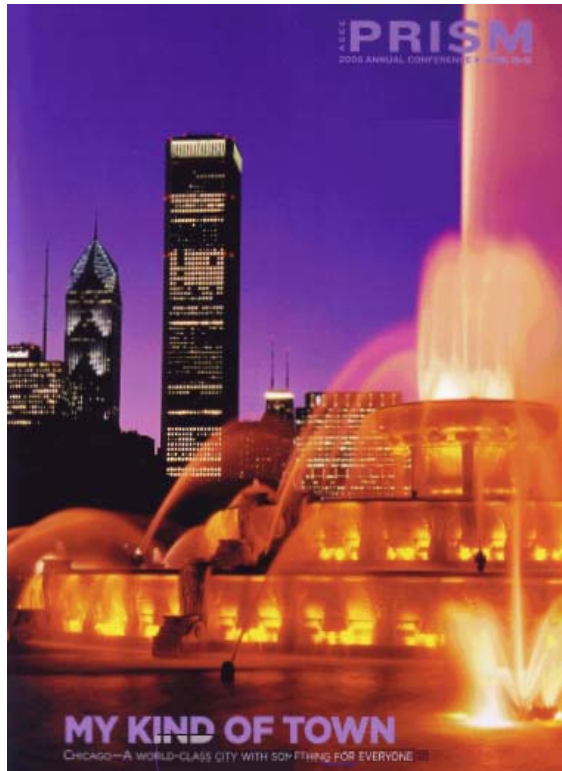
- Carnegie Foundation: Boyer Reports

- Many conferences, meetings...



2006 ASEE Conference

A Socratic Session



Main Plenary

Monday, June 19, 2006

“Advancing Scholarship in Engineering Education: Launching a Year of Dialogue”

Where are we?

Where are we going?

How are we going to get there?

Is it worth the trip?

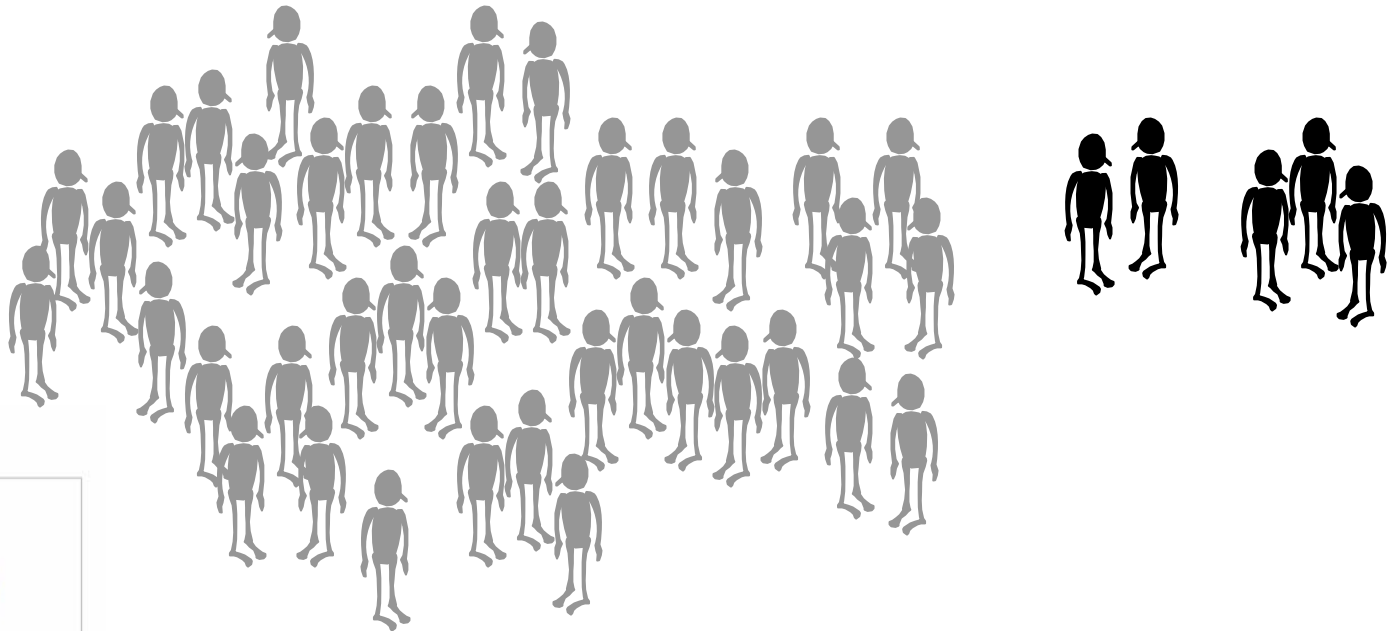
A fundamental shift

From reform to research

- Historically, engineering education renewal involved...
 - episodic calls for major reform (e.g., "design", "integration")
 - curricula experimentation by methodical guessing
- The emerging discipline of engineering education—we've begun to recognize two "truths"
 - vitality of any discipline depends on a vibrant community of scholars advancing the frontiers of knowledge through research
 - how we teach is as important as what we teach

The result?

- We have a small and growing community of **engineering** faculty engaged in education research—however, there is still a much larger community aspiring to join their ranks

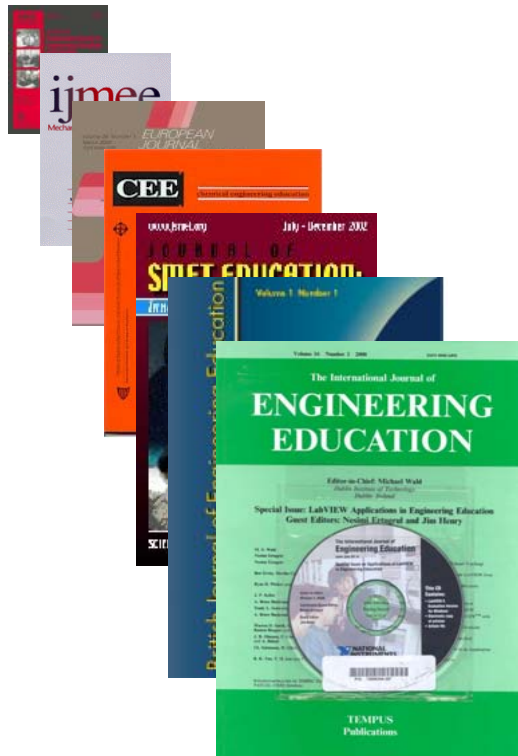


Building a community of scholars

Creating a supportive infrastructure

- Well-defined groups, centers, departments
 - e.g., Purdue University—Department of Engineering Education
- Supportive professional organizations and recognitions
 - e.g., National Academy of Engineering—Gordon Prize
- Adequate resources for basic research
 - e.g., NSF—Engineering Education Research
- Quality forums for archiving knowledge
 - e.g., Journals

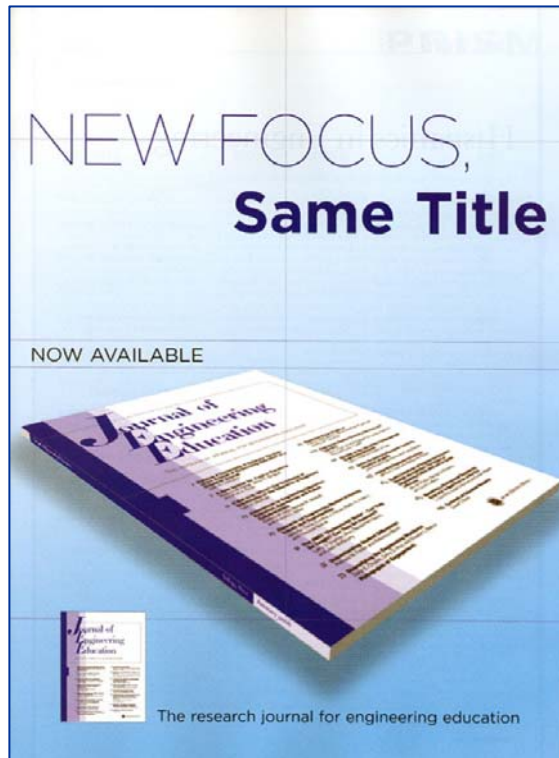
Journals abound



- Most have broad missions; scholarly rigor varies
- Most papers are interesting curriculum innovations but they are not education research
 - Seldom pose research questions
 - Seldom build on learning theory
 - Seldom perform credible evaluations
 - Seldom provide compelling evidence

Need for a research journal

Transformation of *JEE*

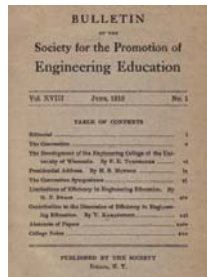


- By 2003, *JEE* concluded the community needed a journal **focused solely on education research** where faculty skilled in education research could be recognized for their work and their articles could serve as role models for others
- New mission: “...to serve as an **archival record of scholarly research in engineering education.**”

Transformation of *JEE*

Journal of Engineering Education

1910-1991



Society communications
& educational innovations



1993-2002



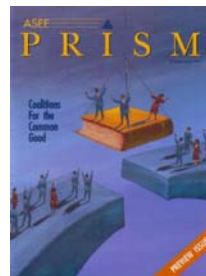
Educational
innovations
(R&D)

2003-Present



Research

1992-Present



Society communications

2007

New
(Online)
Journal

Development

Journal of
Engineering
Education

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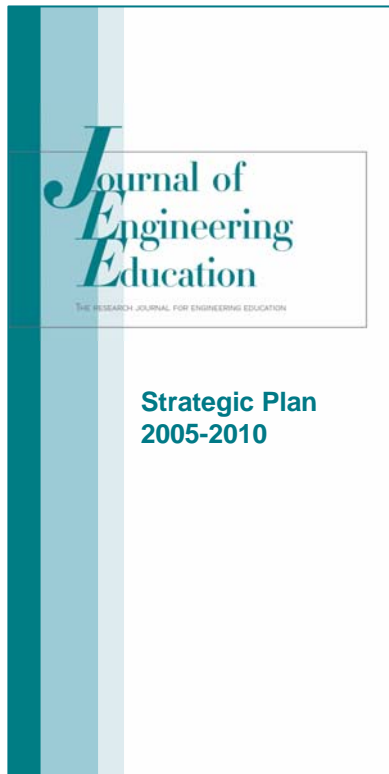
JEE's continued growth

Becoming a world-class research journal

- ☑ Substantially improved manuscript operations
 - In 2004, 92.9% of papers reviewed in 3 months
- ☑ Revamped and published ten review criteria
 - 5 on rigor of research and 5 on quality of composition
- ☑ Publish annually journal statistics and activities
 - Hardcopy today; posted on *JEE* Web pages
- ☑ New international advisory board of stakeholders
 - Faculty, chairs, deans, executives, foundation officers,...
- ☑ Developed a five-year strategic plan
 - Hardcopy today; posted on *JEE* Web pages

Strategic Plan, 2005-2010

“Advancing Engineering Education Research Worldwide”



■ Philosophy (Our values)

“The journal is more than a place to publish papers-- it also serves to build a vibrant community of scholars and practitioners dedicated to advancing scholarship in engineering education.”

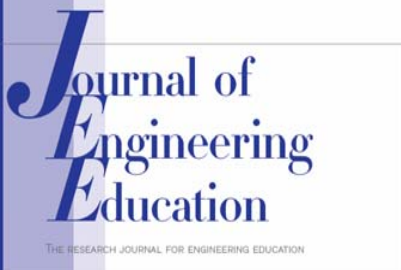
■ Vision (Our aspiration)

“To catalyze a global community of scholars and practitioners dedicated to advancing rigorous scholarship in engineering education.”

■ Mission (Our focus)

“To serve as an archival record of scholarly research in engineering education.”

Community involvement is welcome!



How to build the community?

An editor's perspective

Principal challenge: Having faculty engage their educational innovations with the same scholarly rigor as they do in their technical innovations

■ How many education papers seem to be written

- An idea is tried (on students)
- Students like it (at least most do)
- It's tried again (with same results)
- A decision is made to write it up
- The paper submitted presents:
 - ✓ the problem they faced
 - ✓ how they solved it
 - ✓ what students thought of it (sometimes)

An NRC perspective

U.S. National Research Council lists six guiding principles for scientific inquiry



- Pose significant questions that can be investigated empirically
- Link research to relevant theory
- Use methods that permit direct investigation of the question
- Provide coherent, explicit chain of reasoning
- Replicate and generalize across studies
- Disclose research to encourage professional scrutiny and critique

Turning curriculum innovations into publishable education research

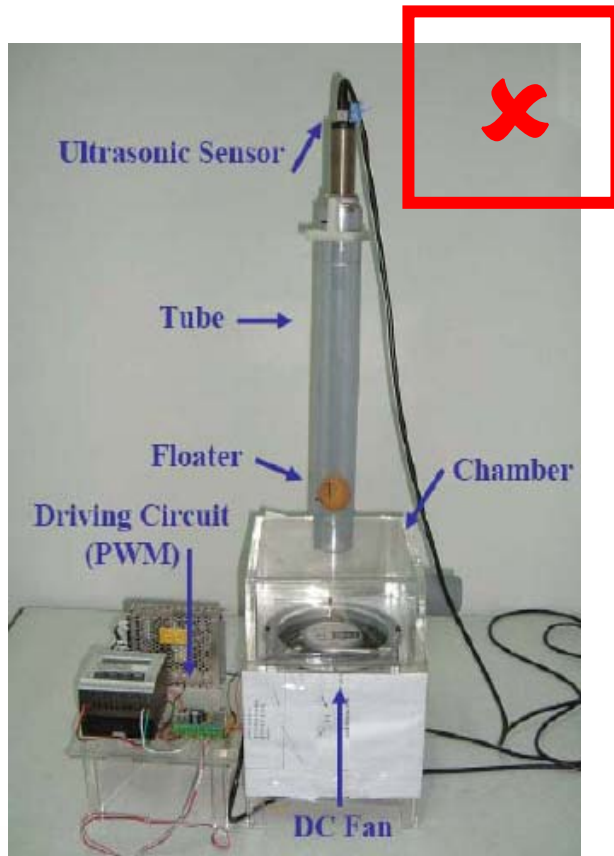
■ General suggestions

- Conceive the innovation as research from the outset
- Engineering education research is multi-disciplinary—collaborate with the right mix of researchers

■ Specific suggestions

- Pose specific research questions (not just the problem solved)
- Build on learning theory (not just the innovations of others)
- Perform a credible evaluation (planning & execution are key!)
- Provide compelling evidence (the more direct, the better)

Most common piece of advice



The focus of the paper should be less on describing the innovation and more on the contributions to the body of knowledge of learning



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Thank You!

- **www.asee.org** (see *JEE* links)
 - Guide for Authors
 - *JEE* Strategic Plan, 2005-2010
 - 2004 Annual Report
(2005 to be posted in May)

- **www.gatech.edu/lohmann**
 - Copy of this presentation