Annals of Research on Engineering Education: Vision, Background and Progress

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Building a Virtual Community of Engineering Education Research Scholars

Frontiers in Education Conference – October 2007

Using a Virtual Journal as a Tool for Nurturing a Community of Scholars

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Judging the Evidence Base for Innovation in Engineering Education

AERA Symposium – April 2004

an opportunity exists to enhance engineering education by increasing the ability of engineering faculty to conduct, communicate, and review high quality education research as well as implement program and curricular revisions based upon the results of such research

Project Description

- Annals of Research on Engineering Education (AREE), will serve to facilitate collaboration within and among engineering disciplines and also serve to facilitate discussion within the Engineering community on
  - a) the rigorous standards by which to conduct, review, and communicate such research as well as,
  - b) the implications for practical implementation of such research.
- The work will be conducted by the National Academy of Engineering. Performance metrics for this project will include
  - a) the level of participation by existing journals,
  - b) the level of commentary and discussion prompted among the readership, and
  - c) progress toward self-sustainability

Annals of Research on Engineering Education - Features

- As an annals, its purpose is **to present, in a unitary fashion, the most rigorous research on engineering education** in a manner that builds upon rather than competes with existing outlets within engineering disciplines;

- It will serve as **a forum for researchers** on engineering education to discuss applicable standards for the evaluation of engineering education research;

- It will serve as **a reference site** offering annotated bibliographies of the most recent research on engineering education research;

- It will serve as **a discussion forum** through which engineering faculty and administrators with limited interest (or ability, or time) in performing research on engineering education can learn of research findings with immediate implications for improved classroom practice;

- It will serve as **a gateway** to existing archives of relevant engineering education conference proceedings (e.g., the Frontiers of Education and curricular materials (e.g., the National Engineering Education Delivery System

- It will serve as a gateway to relevant education research in non-engineering disciplines.

Goals: AREE's editorial policy seeks to achieve 5 goals:

- To link multiple journals reporting research on engineering education and related work in science disciplines through a single interface,
- To increase capacity for the conduct, evaluation, and communication of high quality engineering education research among members of stakeholder communities,
- To increase progress toward a shared consensus within engineering disciplinary communities on quality standards for the conduct, communication, and review of research on engineering education,
- To increase awareness of engineering education research developments by general engineering faculty and administrators, and
- To increase discussion of the significance of research on engineering education and its implications for enhancing student learning among various engineering education constituencies.

AREE – Key Staff

- Managing Editor: Ann McKenna
- Editorial Assistant: Wendy Knapp
- Diamax Information Systems
- Principal Investigator and Publisher: Norman Fortenberry
- Editor-in-Chief: Karl Smith

Talking Points

- Author's Reflective Essay

- How to facilitate (and support) interactive public post-publication discussions?

- Should we adopt the *Structured Abstract*?

Author's Reflective Essay

1. Pose Significant Questions That Can Be Investigated Empirically
2. Link Research to Relevant Theory
3. Use Methods That Permit Direct Investigation of the Question
4. Provide a Coherent and Explicit Chain of Reasoning
5. Replicate and Generalize Across Studies
6. Disclose Research to Encourage Professional Scrutiny and Critique

Scientific research in education. 2002. NRC

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an opportunity exists to enhance engineering education by increasing the ability of engineering faculty to conduct, communicate, and review high quality education research as well as implement program and curricular revisions based upon the results of such research

Search Web

Subject: AREE Summer 2007 Issue

Dear AREE Participants,

We are pleased to announce that the Summer 2007 issue of AREE can be found at www.areeonline.org. The featured resource for this issue provides results from the survey we included in the fall 2006 issue of AREE. The results provide feedback on the submission process and insights into how we might encourage more dialogue or interaction on the site.

In addition, the featured article in this issue is:

"Wishing that I Belonged More in this Whole Engineering Group: Achieving Individual Diversity" by Foor, C., Walden, S., & Trytten, D. (2007). JEE, 96 (2). pp. 103-115. This project utilizes a qualitative research methodology and conducted over 500 ethnographic interviews to better understand individual diversity in engineering education.

As you may know, we are exploring options for sustaining the AREE site and to further develop the intended collaborative aspect of AREE. We are having a special session at FIE to discuss these issues in more detail. If you plan to attend FIE please stop by to join in this discussion:

Session F4H: Building A Virtual Community of Engineering Education Research Scholars, Friday, October 12th, 2007, 5:30-7:00, Oak Room

Additional information about FIE can be found at:
http://fie.engrng.pitt.edu/fie2007/

We hope you enjoy the new issue and we appreciate your continued support and readership.

Sincerely,
Ann McKenna

Karl A. Smith, Editor-in-Chief
Ann McKenna, Managing Editor
Norman Fortenberry, Publisher
Wendy Knapp, Editorial Assistant

Ann McKenna, Ph.D.
Managing Editor, AREE
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Karen Chua, 09:48 ...   Alice Pawley, 10:4...   Repa Reporting Sy...   Out   Junk   In   AREE   Ann McKenna, 11...

QUALCOMM

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ANNALS OF RESEARCH ON ENGINEERING EDUCATION

Welcome, **Karl A. Smith**
[Logout]

Search AREE [Search]

Home | Archives | Discussion | Resources | About | My Account

CURRENT FEATURED ARTICLE

Wishing that I Belonged More in this Whole Engineering Group: Achieving Individual Diversity
DESCRIPTION: Foor, C., Walden, S., & Trytten, D. (2007). JEE, 96 (2). pp. 103-115. This project utilizes a qualitative research methodology and conducted over 500 ethnographic interviews to better understand individual diversity in engineering education.

FEATURED RESOURCES

Survey Results
Featured resource for Summer 2007 AREE Issue

Summer 2007 Vol. 3, No. 2

Teaching, Learning, and Assessment Processes

- Comparing the Effectiveness on Student Achievement of a Student Response System versus Online WebCT Quizzes
- A Procedural Problem in Laboratory Teaching: Experiment and Explain, or Vice Versa?
- Reductive Thinking in Undergraduate CS Courses
- Levels of Abstraction in Students' Understanding of the Concept of Algorithm: The Qualitative Perspective
- Students Learn CS in Different Ways: Insights from an Empirical Study

Teachers and Learners

- Misconceptions about the Particulate Nature of Matter: Using Animations to Close the Gender Gap
- Commonsense Chemistry: A Model for Understanding Students' Alternative Conceptions
- Chemistry in the Field and Chemistry in the Classroom: A Cognitive Disconnect?
- Innovation in Engineering Education based on the Implementation of e-Education
- Constructivist or Instructivist: Pedagogical Concepts Practically Applied to a Computer Learning Environment
- Computer Architecture and Mental Models
- A Strategic Analysis of Korean Engineering Education Based on Two Satisfaction Scores

Courses, Laboratories, Curricula, Instructional Materials, and Learning Technologies

- Peer Instruction in the General Chemistry Laboratory: Assessment of Student Learning
- Environmental Engineering Education in the Gulf Countries
- Using Discourse Analysis to Study a Cross-Disciplinary Learning Community: Insights from an

WELCOME TO AREE

Welcome to an experiment in collaborative scholarship

Ready to register and join the AREE community?
Click here.

What is the Annals of Research on Engineering Education (AREE)?

- A web portal which links education researchers and practioners across engineering domains and between engineering and other disciplines;
- A discussion site for the community of researchers in engineering education and related disciplines;
- A collection of structured summaries of education research articles published in our participating journals;
- A collection of reflective essays on the process of doing education research; and
- A community-developed collection of resources on education research.

Which journals participate? Click here to see our distinguished Editorial Board, consisting primarily of the Editors-In-Chief of the participating journals. If you want to see the list of journals and their web site addresses, click here.

What are the specific goals of AREE? Click here to read more detailed descriptions.

What are the questions that guide the authors' summaries and essays? Click here for the structured summary guidelines. Click here for the reflective essay guidelines.

How can you participate? Click here to learn how you can access the summaries and essays, add to

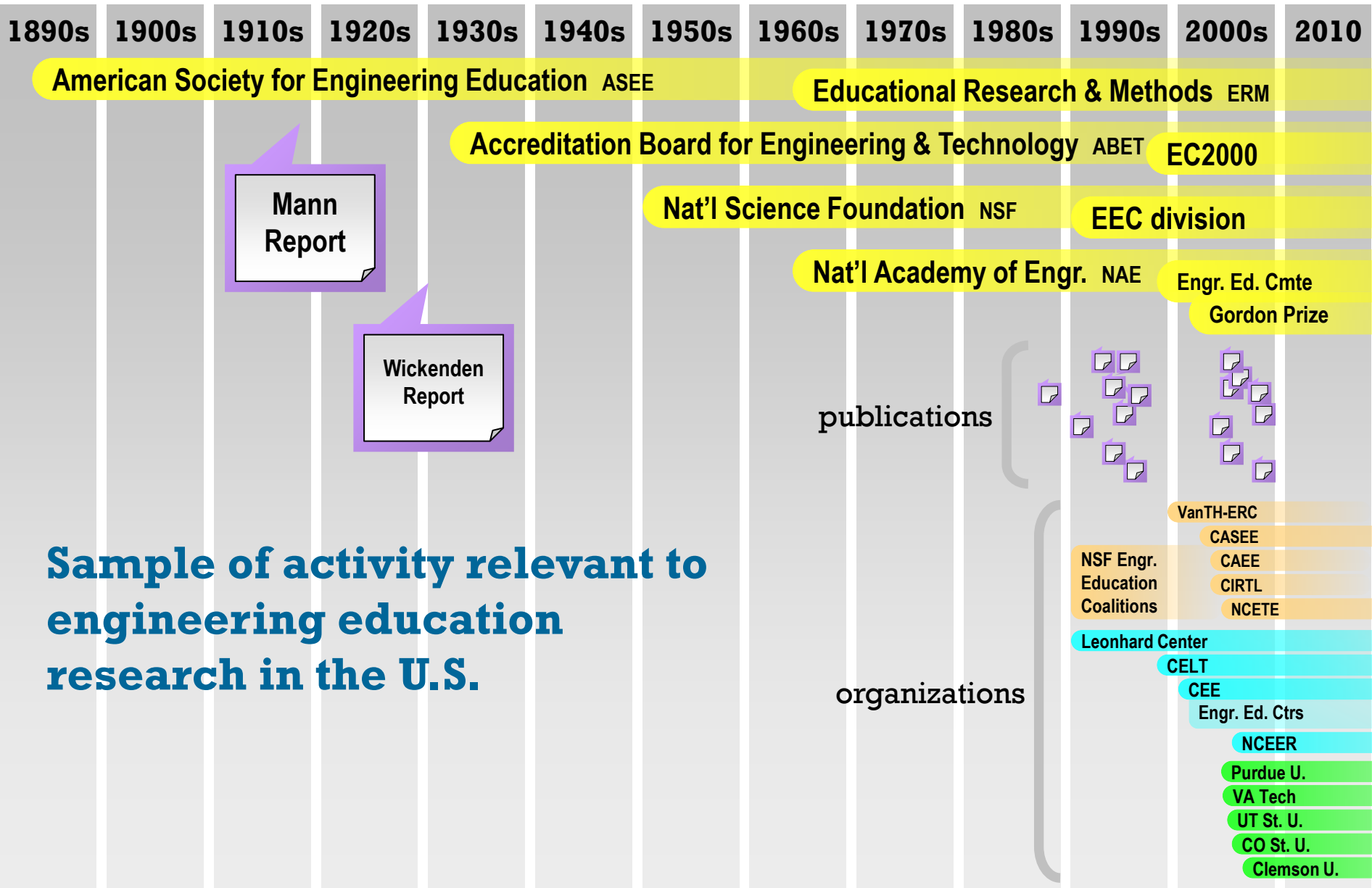# Annals of Research on Engineering Education (AREE)

- Link journals related to engineering education
- Increase engineering education research capacity
- Increase progress toward shared consensus on quality research
- Increase awareness and use of engineering education research
- Increase discussion of research and its implications

- Resources – community recommended
  - Annotated bibliography
  - Acronyms explained
  - Conferences, Professional Societies, etc.
- Articles – education research
  - Structured summaries
  - Reflective essays
  - Reader comments

www.areeonline.org

Author Guidelines for Reflective Essays

- *Length:* Please limit your essay to about <u>one</u> page. (Hence, focus the essay.)
- *Tone:* Feel free to use a conversational tone. This is not a formal piece of writing.
- *Title:* On the submission form, you may change the title of your essay from the automatically generated one, however, please do leave your name in the title.
- *Content:* Choose one or two of the topics below for your essay. Use the guiding questions for your reflection. <u>Note:</u> When you submit the essay on the site, you will need to indicate which of the topics below that your essay addresses.

1. *Research Questions:*
2. *Methodology:*
3. *Analysis of Data:*
4. *Chain of Reasoning:*
5. *Design for Rigor:*
6. *Replicability and Generalizability:*
7. *Lessons Learned:* What are the most important things you learned about doing

Author Guidelines for Structured Summaries

- Not all of the AREE readers will have access to your full article. Therefore, the structured summary needs to give enough information so that the reader can understand and comment on the reflective essays. The format of the summary is a narrative, which should be a page or so in length. In the summary, you should address the following issues:

1. What is the context or background of the study? What are the most significant findings from other research studies which influenced your work?

2. What are the research questions you investigated? Why are they important to engineering education?

3. What theoretical frameworks did you use? Explain any theoretical concepts, such as self-efficacy, double consciousness, transformation learning, etc., which are critical to the research.

4. Discuss your methodology. How did you collect data to investigate your research question? From whom did you collect it? How did you analyze the data?

5. Discuss your major findings and/or conclusions. Outline your chain of reasoning from data analysis to findings. Are there other interpretations which could fit your data and analysis? Are there alternative interpretations which you ruled out?

6. Discuss any recommendations for engineering education. Indicate future research plans or additional questions raised by this research project.

7. Please acknowledge any support you received for the project.

Sample of activity relevant to engineering education research in the U.S.

| 1890s | 1900s | 1910s | 1920s | 1930s | 1940s | 1950s | 1960s | 1970s | 1980s | 1990s | 2000s | 2010 |

American Society for Engineering Education ASEE

Educational Research & Methods ERM

Accreditation Board for Engineering & Technology ABET

EC2000

Nat'l Science Foundation NSF

EEC division

Nat'l Academy of Engr. NAE

Engr. Ed. Cmte

Gordon Prize

Mann Report

Wickenden Report

publications

organizations

VanTH-ERC

CASEE

NSF Engr. Education Coalitions

CAEE

CIRTL

NCETE

Leonhard Center

CELT

CEE

Engr. Ed. Ctrs

NCEER

Purdue U.

VA Tech

UT St. U.

CO St. U.

Clemson U.

CELT / CAEE