Storytelling in Engineering Education

Center for the Advancement of Engineering Education

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Let me tell you a story…

• What is storytelling?

• What can you gain from stories?

• How can you use storytelling in engineering education?
What’s in a story?

• A way of making meaning and sharing transformative experiences
  – Developmental models of learning, identity formation, communities of practice

• A way of investigating knowledge
  – Oral histories, narrative inquiry, etc.

• A way of facilitating innovation and change
Engineering Education Research

• Lots of stories…but we don’t share them
  – How did you get started?
  – What do you do if you don’t have “the numbers”?
  – How can I get tenure or promoted from doing this?

• Storytelling often happens in private or informal settings
  – Hallway, the water cooler, etc.

• Although some public spaces
  – Annals of Research on Engineering Education (AREE)
  – FIE 2005 Interactive session “Communities in Practice – What are We Learning?”
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FIE 2005: A story-poster interactive forum

• We used stories to:
  – Create collaborative knowledge
  – Foster learning and professional development
  – Strengthen social networks
  – Provide strategies for reflective practice

• 6 ISEE Scholars shared their stories and modeled the storytelling process
  – Then engaged others to share their stories
The “story” process

• Posters included
  – Driving passions and goals
  – How they got started and moved forward
  – Difficulties experienced, ways to overcome them

*All the “dirty details” of designing and conducting engineering education research*
the secret life of engineering education researchers

struggles...and strategies

life before the institute

joys

IS MY WRITING THAT BAD?
Understanding Technical Writing Challenges in Civil Engineering
Tad D. Rhoulac, Ph.D. * Department of Civil Engineering * Howard University
Story poster “walk”

• Audience invited to comment on posters with sticky notes, e.g.:
  - Questions: what do you mean by this?
  - Affirmations: I did this, too!
  - New knowledge: I tried this another way…
IS MY WRITING THAT BAD?
Understanding Technical Writing Challenges in Civil Engineering
Toni D. Rhoula, Ph.D. * Department of Civil Engineering * Howard University

Abstract:
Many engineering students and recent graduates struggle with technical writing. This paper addresses the challenges faced by engineering students who lack the necessary writing skills. The current study examined the writing habits of engineering students and found that the majority of students had difficulty with writing assignments. The study also identified common mistakes made by students and provided suggestions for improving their writing skills.

Research Results:
Immediate After the Summit, I...
- realized that the one-year experience in academia...
- came to appreciate the importance of engineering education research...
- learned to focus on the research question.
- received valuable feedback from others...
- improved the way to think about research.

Between the Summit and Fall of 2005, I...
- began writing to complete the research...
- conducted my own evaluation of the reports as instructor...
- attended an industry representative to evaluate the reports...
- practiced the process of writing research.

By the End of 2004, I...
- had so many other duties that the research "lost some steam"...
- stopped asking advantage of the opportunities for discussion of projects with other ISEE scholars.

Conclusions/Lessons Learned:
Concerning Engineering Education Research...
- Select a Topic of Personal Interest (provides motivation)
- Be Sure Data Can Be Reliably Easily Collected (provides encouragement through feasibility)
- Form a Community of Scholars (such as ISEE)...
- Provide Opportunities for Collaboration on Other Projects Result from Research Project (provides collaboration and feasibility)
- Develop a Personal Schedule With Deliverables (provides structure to ensure project is actually completed)

Concerning Technical Writing Research...
- Lack of proficiency of students writing may be due to lack of understanding of grammar, punctuation, and style
- Instructors may need to "grade harder" when determining whether a student has mastered the material
- Many students are pressured by their graduating year to meet workplace writing expectations.

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Conversations around posters

• Discussing stories in the poster

• Eliciting new stories
  – How did you get started – what are passionate about?
  – What are your experiences (good and bad)?
  – What advice would you give?
  – What are you learning?
Going public

• Each table asked to report out, e.g.:
  - Confusing engineering education research with doing more teaching or teaching better
  - The real struggles are the ones that aren’t in the books
  - Choosing research questions that MATTER
  - Ways of motivating engineering departments to value this kind of research
  - The importance of finding a “home” (community)
  - “At play” in the space between teaching and research
  - Learning how to frame your work so its relatable to others
  - Research process ← → learning process
  - Formulating questions “is” research
  - Doing this is like going through a second PhD process
So what’s in a story

- 39 evaluation forms
  - “Very high” ratings: quality of session, importance of topic, good use of time

- Open ended questions
  - “building knowledge through sharing stories and constructing new knowledge”
  - “opportunity to benefit from the experiences of others through small group discussions”
  - “good way to network with others in the field”
  - “talking about community and also building it”
  - “affirming process...promoted critical thinking and reflection”

- Observations – volume of conversations and interaction
For new engineering education researchers…

• Storytelling can provide important pathways into a community of practice, access to community knowledge, and opportunities to co-construct knowledge

• Storytelling posters – provide a mechanism for scholarly discourse around topics that are not often made public
What do we learn by telling stories?

• How to listen and understand different points of view

• How to communicate across perspectives

• How to look for connections across perspectives

• How to elicit someone else’s story
  – How did you get started? What difficulties have you experienced and how did you deal with them? What did you find rewarding? What surprised you? What advice might you give?

• How to tell your own story
  – Start with someone you trust who is a generous listener
  – Reflect on your own experiences (use questions above)
Summary

• Storytelling is one way of creating and sustaining community

• We’ve provided one example of how this can work

• We hope to see more storytelling in the engineering education community
To be continued...

FIE 2007

*Special Session:* Communities of Practice in Engineering Education: How Do We Investigate Diversity and Global Engineering?
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2004 ISEE Scholars include (in alphabetical order): Joe Cannon (Howard University), *Russ Caspe (U Washington), Eric Cheek (NCA&T), *Brian Flinn (U Washington), Brian Fabien (U Washington), Scott Eberhardt (U Washington), *PK Imbrie (Purdue University), Linda Lee (U Washington), Maisy McGaughey (U Washington), Lawrence Neeley (Stanford University), *Tori Rhoulac Smith (Howard University), Louis Rosenberg (California Polytechnic State University, San Luis Obispo), Jeremy Sabol (Stanford University), *David Socha (U Washington), Tom Williams (U Washington), *Denise Wilson (U Washington), and *Ken Yasuhara (U Washington).