

Developing communication skills in engineering students at a large research university: an evaluation of current methods in the context of writing studies

Nicole Turnipseed^{1,2}, John Yoritomo³, S. Lance Cooper³, Celia M. Elliott³, John S. Popovics⁴, Paul Prior^{1,2}, and Julie L. Zilles⁴

¹Department of English, ²Center for Writing Studies, ³Department of Physics, ⁴Department of Civil and Environmental Engineering
University of Illinois at Urbana-Champaign



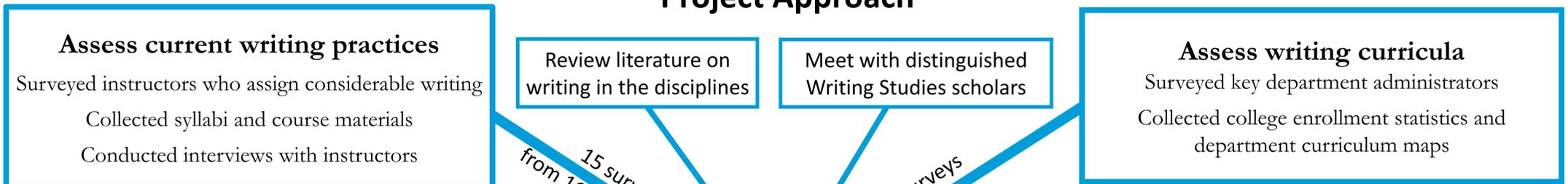
Motivation

Good communication skills are critical for engineering students to excel after graduation, but challenging to develop in the curriculum. Our team sought to assess current writing instruction across departments in the College of Engineering.

- Characterize writing instruction across the College of Engineering
- Synthesize relevant work in Writing in the Disciplines
- Identify best practices and recommendations for effectively and efficiently improving our students' writing

Objectives

Project Approach



Assess current writing practices

Surveyed instructors who assign considerable writing
Collected syllabi and course materials
Conducted interviews with instructors

Review literature on writing in the disciplines

Meet with distinguished Writing Studies scholars

Assess writing curricula

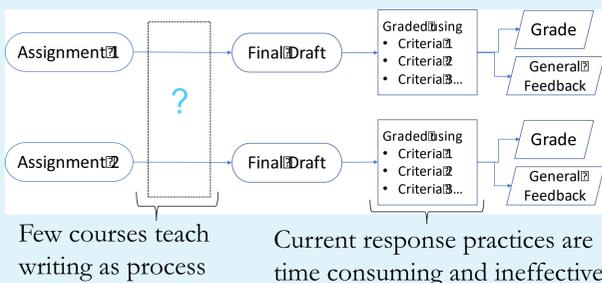
Surveyed key department administrators
Collected college enrollment statistics and department curriculum maps

Instructional Findings

Instructional Challenges Identified

- Student attitudes/engagement
- Training TAs
- Time constraints
- Differences in student needs, preparation, and language backgrounds
- Balancing writing instruction and content
- Assignment design/scaffolding

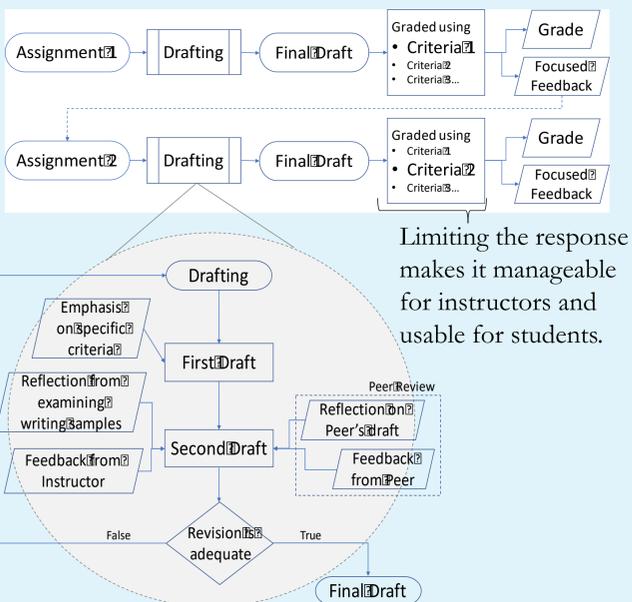
Common current response pattern



Applying Best Practices

- Assignment design & sequencing
- Writing process instruction
- Response and grading

Rolling response focus in repeated genres



Findings

Engineering faculty recognize that writing is important for engineers and that improvements are needed.

Surveys suggest students are likely to use a wide range of professional writing genres after graduation, but are exposed to few professional genres as undergraduates.

| Instructional Genres | Genres expected to use after graduation |
|----------------------|--|
| Presentation | Project reports, Email, Progress reports |
| Quiz | Documentation of protocols, Executive summaries |
| Lab notebook | Conference proceedings, Conference presentations |
| Team written reports | Technical memoranda, Abstracts, Journal articles, Posters |
| Exam | Planning reports, Grant proposals |
| Lab reports | Recommendations, Instruction manual, Reports to regulatory agencies |
| Abstracts | Professional journals, Lab reports, Lectures, Government documents |
| Progress reports | Training manuals, Patent whitepaper, Research highlights for the web, News articles |
| Email | Professional uses of social media, Blogs, Press releases, Referee reports, Lab pages |
| Project reports | |

In the current curriculum, we find both innovative approaches to teaching engineering writing from which to build, and ways in which our curriculum and instruction do not align with writing studies' best practices for writing development.

Key opportunities

- Teaching writing as a process,
- Embedding writing instruction in technical coursework,
- Including more professional genres, and
- Teaching for genre flexibility.

Future Directions

| | |
|------------------------|---|
| Implementation | <ul style="list-style-type: none"> • Educate faculty about best practices, beginning with those already teaching writing-intensive courses • Provide support for faculty to develop course-specific implementations |
| Experimentation | <ul style="list-style-type: none"> • Experiment with assignment design and response that allow writing instruction at large scale • Experiment with vertical writing curriculum |
| Research | <ul style="list-style-type: none"> • Develop best practices for teaching for genre flexibility • Investigate ways to leverage extracurricular activities to provide meaningful writing experience |

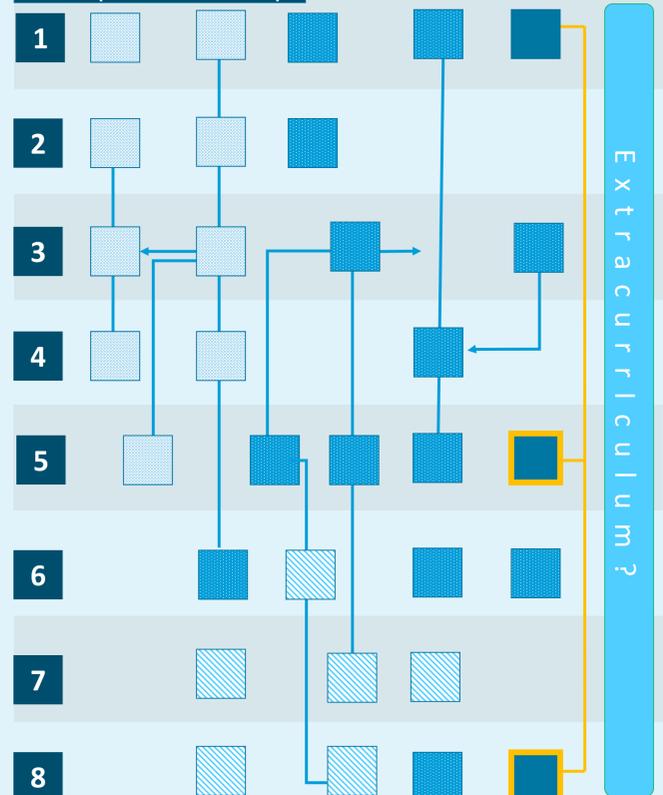
Curricular Findings

Curricular Challenges Identified

- Faculty motivation and prior training
- Lack of coordination across the curriculum
- Scale
- Differences in student career paths
- Packed curriculum

Focused work on writing occurs in few courses and primarily at the end of the curricula.

Example course map



- Supporting math/science
- Technical elective
- Core disciplinary content
- Focused disciplinary writing instruction

Supporting Best Practices

- Vertical writing curriculum
- TA training/support
- Coordinating sharing of support materials across courses
- Developing a community of practice across the college