

**Grand Valley State University**

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March 19, 2016

# Learning Technical Writing: Creating an Opportunity for Engineering Undergraduates

Debbie Morrow



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Padnos College of Engineering & Computing  
School of Engineering

# Learning Technical Writing: Creating an Opportunity for Engineering Undergraduates

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ASEE-NCS Conference  
Central Michigan University  
Mt. Pleasant MI, 18-19 March, 2016



I will be outlining and sharing a few details about an effort in Grand Valley State University's School of Engineering to meet an identified need in what we believe is a somewhat novel, and a little daring, way.

## The School of Engineering Goal



“... to design a radical curricular revision intended to create a synergy between liberal education ideals and real-world engineering practice in the area of technical writing and communication.”

When I say "we" I think you should know that I am not a member of the School of Engineering Faculty. I am the Engineering Liaison Librarian from the University Libraries faculty, and I am having the exciting opportunity to collaborate with Engineering in devising and piloting a new bit of curriculum.



- Approx. 350-400 first year students indicate interest in an Engineering major
- Approx. 140 will continue this year as Engineering majors (after secondary admission at end of 2<sup>nd</sup> yr.)
- 5 majors – CE, EE, ME, PDM, Interdisciplinary Egr.
- Engineering's BSE degree is **at least** 126 credits incl. GenEds (120 for most GVSU degree programs)

Grand Valley State University's School of Engineering graduates 100-120 extremely capable new engineers each year.

# Constraint: Curriculum Requirements

## School of Engineering:

- BSE degree program includes **3 required** co-op work semesters; no “summers off” after beginning of 2<sup>nd</sup>



	Fall (Sept - Dec)	Winter (Jan - April)	Spring/Summer (May - Aug)
1 <sup>st</sup> Year:	Foundational Courses	Foundational Courses	Open
2 <sup>nd</sup> Year:	Foundational Courses	* Foundational Courses	** Co-op I
3 <sup>rd</sup> Year:	Program Courses	Co-op II	Program Courses
4 <sup>th</sup> Year:	Co-op III	Program Courses Senior Project	Program Courses

\* Provisional promotion, early January

\*\* Secondary admission to SoE, May

Our BSE program requires three full semesters of paid co-op internship during years two through four. This isn't a preference or a suggestion: passing three co-op terms, typically with one employer and increasing responsibility, is required to complete the degree. This real-world work experience makes our graduates a highly valuable commodity as new professional employees, and most of them already have a job offers in hand when they receive their diplomas.

We know from employer surveys and the School's engineering industry advisory board that GV engineers begin their fulltime jobs with a sound base of knowledge, with a year of workplace experience, and with can-do confidence. But we also know from employers that stronger written communication skills would make our students even more valuable employees.

This semester the School of Engineering is piloting a radical revision of the second co-op semester to provide real-world, work-based technical writing instruction and learning, with a group of 11 students. The plan is to evaluate this semester's experience, and to revise and scale up the course by Winter 2017, for all Engineering majors during their Co-op 2 semester.



## Constraint: Curriculum Requirements

### University:

- **ALL** GVSU undergraduates must pass 2 'Supplemental Writing Skills' (SWS) courses. To be designated SWS:
  - One-third of the course grade (at least) is based on writing assignments
  - Course content includes minimum 4 hours of writing instruction
  - Students write a minimum of 3000 words
  - Iteration and revision are required, and peer review is strongly encouraged
  - "Writing" may include some essay-type exam questions, but long-form writing is required



Grand Valley is somewhat unique as a university of its size, presently about 25,000 students. Its mission and vision are founded on liberal education principles embedded across all disciplines. Even students in professional programs must pass two specially designated writing-intensive courses to graduate.

The University's "Supplemental Writing Skills" or SWS designation requires that a course meet these criteria:

- At least one-third of the course grade is based on writing assignments
- Course instruction includes a minimum of four hours of writing instruction
- Students write a minimum of 3000 words
- Iteration and revision are required, and peer review is expected
- "Writing assignments" may include some essay-type exam questions, but the emphasis must be on long-form writing

These are the constraints on the academic components that we molded into a curriculum to pilot. They were further impacted by the fact that it all has to happen asynchronously online while students are working full time.

Early in the planning process we did some literature searching and made contacts through ASEE-Engineering Libraries Division, to determine whether a writing-intensive curriculum delivered online as part of a content-area course already existed; we didn't find any.

## Co-op 2 – SWS Pilot: Academic Components



### ➤ **Personal Professional Journal**

- Responses to prompts (4 x 300 words)

### ➤ **Learning Modules**

- Readings and quizzes (2)

### ➤ **Preliminary Proposal**

- Technical proposal idea in memo format (300 words)

### ➤ **Peer-Reviewing Platform Practice**

- Using Sample Technical Proposals

### ➤ **Technical Proposal**

- Ver.1 & revised final version (1500 words)

### ➤ **Peer Reviews**

- Technical Proposals - ver.1 (3) & final versions (3)

Our pilot syllabus includes a number of small assignments introducing written technical communication as a genre with particular purposes and characteristics. These assignments include some writing practice and some content delivery with quizzes. The centerpiece of the writing-intensive curriculum is to identify, propose, and write up a formal technical proposal. This long-form piece is of a type that our students will be preparing not only in their future professional careers, but also much sooner in their Senior Design Project teams.

## Co-op Program Expectations



### Student

- Good attitude and hard work
- Written/web homework and weekly journal

### Company

- Degreed engineers supervise and mentor student
- Progressively responsible engineering work

### Faculty

- Support/assess each student, every semester

### All

- Evaluations
- Three semesters with the same company

Students aren't required to select a project that they will necessarily implement; in fact they might even choose to write up something that is entirely hypothetical. However, we encouraged them in the first week of the semester to explore opportunities in their employment setting. We believe that the opportunity to write a proposal about a project that each student might actually carry out as a work assignment will increase their motivation to apply writing instruction and previous knowledge to producing a high quality piece of technical writing.



## Infrastructure: Blackboard (course management system)



- Course information (syllabus, etc.)
- Course documents (assignment handouts, etc.)
- Course assignments (selected assignment submission modules, connected to Bb Grade Center)
- Quizzes (associated with Learning Module assignments, connected to Bb Grade Center)
- **Discussion board – in Win'16 pilot, vehicle for disseminating writing instruction content**

Instruction is delivered via the University's online course management system (Blackboard). Learning module readings and quizzes are managed online using Blackboard functions. Short assignments including four personal professional journal responses to prompts and a memo identifying a project that will be formally proposed are uploaded into Blackboard for feedback, revisions, and grading.

## Infrastructure: CrowdGrader & Peer Reviewing

- Access with any Google account
  - Reasonably granular administrative options
  - Free
  - You get what you pay for!
- Using CrowdGrader to manage:
  - Peer-review practice on Sample Technical Proposal
  - Technical Proposal ver.1 + peer reviews
  - Technical Proposal Final Version + peer reviews



For managing the process of peer-reviewing drafts of formal technical proposals, we are trying out a free web-based platform called 'CrowdGrader.' After assignments are uploaded during a submission period, each student is randomly assigned a number of peer submissions to respond to during a review period, following a rubric. Students support each other in the writing process and improve their own analytical skills through peer-reviewing. Only the final versions of the Technical Proposals will receive recorded grades, and grades on the Technical Proposals will be based entirely on evaluation of student performance in technical writing.

As of this week, version 1 drafts of Technical Proposals have been submitted into CrowdGrader, and students are each obliged to provide review input for three randomly assigned submissions from peers. A small portion of their course grade will reflect the substantiveness and constructiveness of the review feedback students provide to their peers.

## Notes on a Work-in-Progress



- What we know now:
  - So far the initial syllabus has held up well
  - Instructional content is being developed as the semester progresses

### After the pilot semester

- Will want to know:
  - How students assess the academic workload
  - How students assess the value of the Technical Proposal exercise
  - How employer supervisors assess the value of the Technical Proposal exercise
- Will have to evaluate:
  - If/how CrowdGrader can scale up to meet needs for a full Co-op 2 cohort
  - What modes of delivery will be effective for delivery of instructional content

### Long-range

- Are GVSU Engineering seniors and BSEs more capable and confident technical writers?

This is a work in progress. As instructor for the pilot section, I am building instructional content as the term progresses, and collecting observations and anecdotes about the experience of the curriculum from my own perspective and that of the pioneer group of students. By the end of the semester we'll also have gathered survey or focus group input from the students and from their employer supervisors. Taken together, these data will allow us to consider revisions necessary to scale up this course curriculum for ten times the number of students in Co-op 2 next winter, and their multiple Engineering faculty instructors.

Our hope is that GVSU's engineering students will find that their very demanding major now provides them another valuable skill in a real-work, real-world context.

Thank you!

*Debbie Morrow*

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