Instructional Tools for Setting Expectations and Developing Students' Audience Awareness for Capstone Design Writing

JESSIE CORTEZ, LAFAYETTE COLLEGE

JOANNA TSENN, TEXAS A&M UNIVERSITY

Agenda

- Background and Context
- Report Grading Criteria
- Sample Evaluation and Revision Activity
- Audience Awareness Activity
- Assessment Tips for Instructors
- Discussion and Q&A

Background and Context

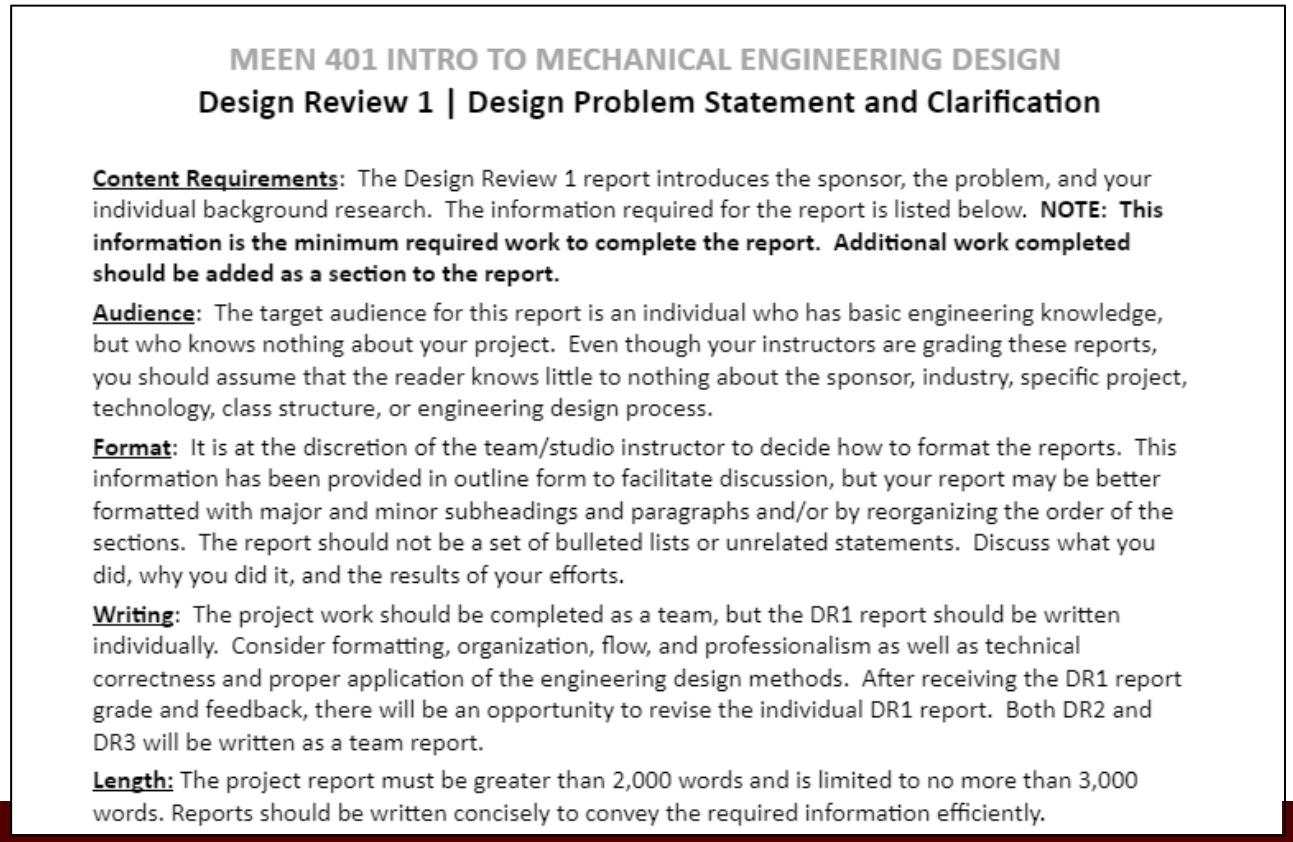
Overall Writing Goal

Improve MEEN 401 students' technical writing skills by preparing resources for both students and instructors

MEEN 401: Introduction to Mechanical Engineering Design

Writing-intensive course

Requires one writing assignment (individual report) to satisfy the W-course designation



MEEN 401 INTRO TO MECHANICAL ENGINEERING DESIGN

Design Review 1 | Design Problem Statement and Clarification

Content Requirements: The Design Review 1 report introduces the sponsor, the problem, and your individual background research. The information required for the report is listed below. **NOTE: This information is the minimum required work to complete the report. Additional work completed should be added as a section to the report.**

Audience: The target audience for this report is an individual who has basic engineering knowledge, but who knows nothing about your project. Even though your instructors are grading these reports, you should assume that the reader knows little to nothing about the sponsor, industry, specific project, technology, class structure, or engineering design process.

Format: It is at the discretion of the team/studio instructor to decide how to format the reports. This information has been provided in outline form to facilitate discussion, but your report may be better formatted with major and minor subheadings and paragraphs and/or by reorganizing the order of the sections. The report should not be a set of bulleted lists or unrelated statements. Discuss what you did, why you did it, and the results of your efforts.

Writing: The project work should be completed as a team, but the DR1 report should be written individually. Consider formatting, organization, flow, and professionalism as well as technical correctness and proper application of the engineering design methods. After receiving the DR1 report grade and feedback, there will be an opportunity to revise the individual DR1 report. Both DR2 and DR3 will be written as a team report.

Length: The project report must be greater than 2,000 words and is limited to no more than 3,000 words. Reports should be written concisely to convey the required information efficiently.

Before we continue, we want to hear from you:

What writing issues do you commonly see in your capstone design courses?

Student Challenges & Goals

CHALLENGES

- Assuming ethos of professional engineers
- Writing DR1 while learning about project
- Report written individually; project team-based
  - Reports must complement one another

GOALS

- Clarify expectations and grading
- Improve quality of reports

Workshop Files

ALL DOCUMENTS WE REFER TO TODAY ARE AVAILABLE ON TX.AG/401WRITING

Report Grading Criteria

FOR STUDENTS

DR1 Grade Sheet Overview - Categories

For our purposes, here's the distinction between "content" versus "writing":

Content - The accurate documentation of expected information in the report

Writing - The effective communication of information in the report

Technical Content (50%)	
Introduction	10%
Background Research	20%
Problem	15%
Conclusion	5%

Writing (50%)	
Rhetorical Appropriateness	20%
Formatting and Organization	20%
Writing Mechanics	10%

Writing

1. Rhetorical Appropriateness
2. Formatting and Organization
3. Writing Mechanics

Rhetorical Appropriateness

Rhetorical Appropriateness refers to the writer's ability to communicate effectively with their audience.

Writing that is rhetorically inappropriate fails to reach the audience with the information they need.

In the next few slides, I'll provide examples of rhetorically inappropriate writing for a design report.

Rhetorical Appropriateness

Overly Technical Jargon: Using too much specialized language.

Informal Tone: Writing that is too conversational or friendly.

Unsubstantiated Claims: Making assertions without providing data or citations to support them.

Rhetorical Appropriateness

Let's practice. The following slides contain sentences that fall under one of the categories.

As I click through the slides, we'll talk about:

1. Which category best describes each sentence
2. Why the sentence is rhetorically inappropriate

Rhetorical Appropriateness

Sentence #1: "So, we figured we'd just go ahead and redesign the whole thing because the old model was kinda messed up."

A. Overly technical jargon
B. Informal tone
C. Unsubstantiated claim

Rhetorical Appropriateness

Sentence #2: "The new design is guaranteed to increase efficiency by at least 50%."

A. Overly technical jargon
B. Informal tone
C. Unsubstantiated claim

Rhetorical Appropriateness

Sentence #3: "Utilizing a bifurcated approach to the iterative prototyping phase ensures optimal kinematic efficiency and mitigates stochastic variability."

A. Overly technical jargon
B. Informal tone
C. Unsubstantiated claim

Writing

1. ~~Rhetorical Appropriateness~~
2. Formatting and Organization
3. Writing Mechanics

Formatting and Organization

Formatting and Organization covers the structural elements and visual components of your report, including section headings, font, and formatting of figures and citations.

Formatting

Formatting refers to the layout of the words and graphics on the page. This includes

- Font selection, size, and formatting
- Spacing
- Headings and seriation

Even though this is a technical report, it should have visual appeal.

Organization

Organization refers to the arrangement of ideas as they are presented at the section, paragraph, and sentence levels. Organization happens at the local and global levels.

Local organization:

- Words
- Sentences
- Paragraphs

Global organization:

- Subsections
- Sections
- The document as a whole

Organization

Words, sentences, paragraphs, etc. need to flow logically from one another. The relationship between them needs to be clear.

To effectively organize your writing, be sure to use transitions between sentences, paragraphs, and sections.

Section headings do not count as transitions!

Writing

1. ~~Rhetorical Appropriateness~~
2. ~~Formatting and Organization~~
3. Writing Mechanics

Writing Mechanics

Writing Mechanics deals with the rules and conventions of standard written English, including grammar, usage, punctuation, capitalization, and spelling.

Writing Mechanics

Notice that Writing Mechanics is 10% of the writing grade, compared to Rhetorical Appropriateness and Formatting & Organization, which are each 20% of the grade.

What does this tell you about where you should spend your effort?

DR1 Grade Sheet Overview - Rubric

TEXAS A&M UNIVERSITY
J. Mike Walker '66 Department of Mechanical Engineering

	Scores					
Criteria and Defintion	**Notes**	**Exemplary (5)**	**Good (4)**	**Acceptable (3)**	**Needs Improvement (2)**	**Unacceptable (1)**
Rhetorical Appropriateness: The writer's ability to communicate effectively with their audience.	The target audience for this report is an individual who has basic engineering knowledge but knows little to nothing about the sponsor, industry, specific project, technology, class structure, or engineering design process.	The report clearly documents and communicates the design process in relation to the problem. The writer demonstrates a high degree of professionalism through their tone. Jargon is kept to a minimum and technical terms are explained when necessary. All sections communicate their respective content effectively to the audience.	Overall, the report documents the design process in relation to the problem. The sections communicate their respective content, but they are sometimes disjointed from one another.	For the most part, the report documents the design process in relation to the problem. The sections communicate their respective content, but the audience may need to ask clarifying questions about jargon or other technical content.	The report attempts to document the design process in relation to the problem, but does not clearly communicate the steps or how the writer approached them. The audience would not have a clear understanding of the writer's design process or their reasoning behind it.	The report attempts to document the design process but does not take into account the problem. After reading this report, the audience would not understand the writer's design process nor their reasoning behind it.
Formatting and Organization: The appropriate use of structural elements and visual components of the report, including section headings, font, and formatting of figures and citations.	Your report may be better formatted with major and minor subheadings and paragraphs and/or by reorganizing the order of the sections. The report should not be a set of bulleted lists or unrelated statements. Discuss what you did, why you did it, and the results of your efforts.	The report contains all necessary components and is formatted with care and attention. The writer effectively uses topic sentences, transitions, signposts and other structural elements to establish a clear internal logic for the report. Pages are numbered and all figures and appendices are appropriately labeled, cross-referenced, and discussed in the main text. Section headings follow a clear, consistent organizational logic. The references page and in-text citations are formatted appropriately according to ASME guidelines.	Overall, the report contains all necessary components and is well formatted. The writer establishes a clear, consistent organizational logic for the report, though there are some mistakes in formatting which detract attention from the content. Figures and appendices are appropriately labeled and cross-referenced with rare, minor mistakes. The references page is formatted. Section headings follow a consistent organizational logic.	For the most part, the report contains all necessary components and is generally well formatted. The writer generally keeps a consistent internal logic for the report. Figures and appendices are labeled and cross-referenced, though there may be some mistakes. The references page is formatted. There are section headings, but they are either unnecessary or inconsistent in their logic.	The report contains all necessary components but does not follow a clear organizational logic. The individual sections feel separate from one another instead of establishing a consistent internal logic from introduction to conclusion. Figures are not appropriately labeled, cross-referenced, or discussed. The references page is not appropriately formatted.	The report is missing sections, is not formatted appropriately, or is otherwise so disorganized as to hinder the audience's understanding of the work. There was either no attempt to format the references page or it is nonexistent.
Writing Mechanics: Adherence to the rules and conventions of standard written English, including grammar, usage, punctuation, capitalization, and spelling.		The entire report is written coherently and cohesively. The report is free of grammatical and usage errors.	Overall, the report is generally written coherently and cohesively. There are minor grammatical or usage errors, but they do not hinder the overall clarity of the work.	For the most part, the report is written coherently and cohesively, though with some exceptions. There are minor grammatical or usage errors that sometimes hinder clarity of the work at the sentence level.	The report is written coherently but lacks cohesion. There are significant grammatical and usage errors that hinder the audience's understanding of the report.	The report lacks coherence and cohesion. The writing is difficult to understand because of significant grammatical or usage errors.

Sample Evaluation and Revision Activity

FOR STUDENTS

Considering Introductions

Think about the introduction to any piece of writing, including those you've written.

What should a good introduction do?

With that in mind, what should the introduction to your DR1 do?

Evaluating DR1 Introductions - Scenario

Scenario: Three members of a senior design capstone team have been working on the introductions to their DR1 reports. Each of them has taken a different approach, and they are trying to decide who has written the best introduction.

Evaluating DR1 Introductions - Instructions

Your instructor will share all three sample introductions (links on next slide).

For the next ten minutes, work with your team to:

- Skim each sample
- Jot down some notes about what each sample does well and how it could be improved
- Using the criteria in the rubric (Rhetorical Appropriateness, Formatting and Organization, Writing Mechanics), rank the introductions from "needs most improvement" to "best."

Once the 10 minutes have elapsed, the teams will discuss their ranking of the samples as a class.

Evaluating DR1 Introductions - Links

The "Sample Introduction Sections" and "Design Review 1 Rubric and Grade Sheet" files can be downloaded from

https://sites.google.com/tamu.edu/meenwritingresources/meen-401

or http://tx.ag/401Writing

Evaluating DR1 Introductions - Discussion

Discussion Questions:

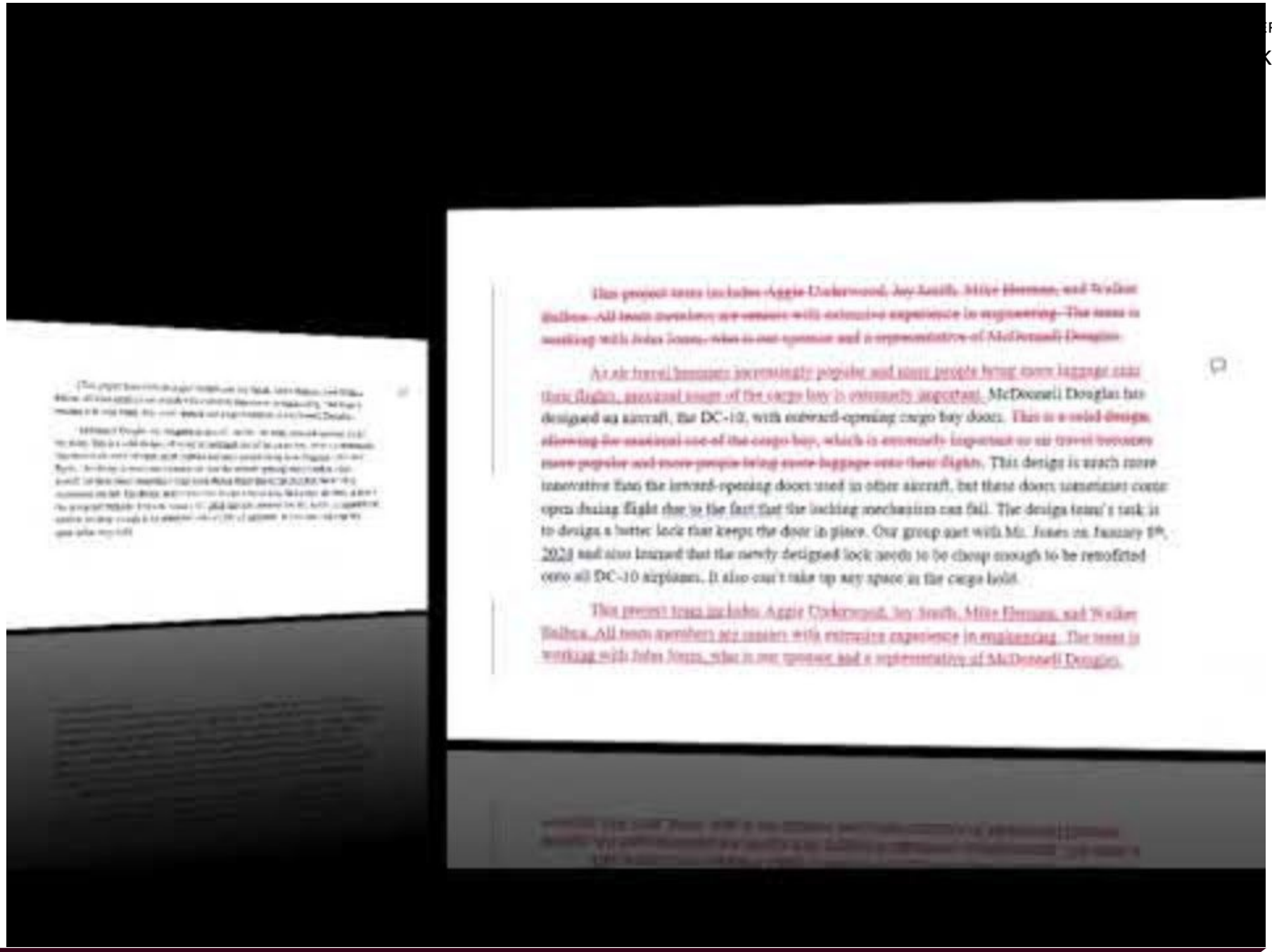
- What is the problem that the team is addressing?
- Which introduction did the best job of explaining the problem?
- Using evidence and examples from the introductions, identify
  - Strong points from any of the introductions
  - Weak points from any of the introductions
- Which introduction appears to be the best? Why?

Revising a DR1 Introduction

Revising a DR1 Introduction – Scenario and Discussion

Scenario: Upon further reflection, the student who wrote Sample Introduction 1 wants to revise their introduction.

In the next slide, Dr. Cortez will talk you through how Sample Introduction 1 can be improved through revision.



As air travel becomes increasingly popular and more people bring more luggage onto their flights, structural integrity of the cargo bay is extremely important. McDonnell Douglas has designed an aircraft, the DC-10, with outward-opening cargo bay doors. This is a solid design, allowing for maximal use of the cargo bay, which is extremely important as air travel becomes more popular and more people bring more luggage onto their flights. This design is much more innovative than the inward-opening doors used in other aircraft, but these doors sometimes come open during flight due to the fact that the locking mechanism can fail. The design team's task is to design a better lock that keeps the door in place. Our group met with Mr. Jones on January 8th, 2020 and also learned that the newly designed lock needs to be cheap enough to be retrofitted onto all DC-10 airplanes. It also can't take up any space in the cargo hold.

This project team includes Aggie Underwood, Jay Smith, Mike Herman, and Walker Balboa. All team members are seniors with extensive experience in engineering. The team is working with John Jones, who is our sponsor and a representative of McDonnell Douglas.

Audience Awareness Activity

FOR STUDENTS

Why we started this activity

After implementing the rubric introduced earlier in this workshop, we noticed that many of our students struggled with the concept of Rhetorical Appropriateness, which manifested as overly technical jargon, informal tone, and unsubstantiated claims, among other issues.

What became clear was that there was a disconnect between the students, audience, and purpose of the report.

Who is the audience?

This disconnect was evident in students' answer to the question: Who is the audience for this report?

Students' answers:

- Instructors, professors, "the person who grades it"
- Peers, groupmates
- Sponsors

Who is the audience?

The correct answer, as stated in the assignment sheet:

The target audience for this report is an individual who has basic engineering knowledge, but who knows nothing about your project. Even though your instructors are grading these reports, you should assume that the reader knows little to nothing about the sponsor, industry, specific project, technology, class structure, or engineering design process.

Audience Awareness Activity

To help students see the DR1 not just as a class assignment but as a technical report written to document their decision making for a professional audience, we developed this DR1 Planning Activity.

Link to DR1 Planning Activity

Audience Awareness Activity

What we're asking students	What we want them to think about
Part 1: What are your intended outcomes?	What is the purpose of a technical report? What is the purpose of each section of a technical report?
Part 2: What does the reader need to know?	What concepts do engineers engage with when designing a solution to a problem?
Part 3: What does the reader already know? What do you need to teach them?	Which concepts can we expect (almost) any engineer to know? Which concepts are more specialized?
Part 4: Outlining your DR1	Where is it most appropriate to discuss each concept in the report? How much detail do I need to go into for each concept? How do the concepts relate to one another?

Student responses to the activity

"Helpful!"

"Good intro to DR1 writing"

"I liked the systemic approach to organize thoughts for the DR1"

"The assignment… helps us bridge the gap between what we may know and what the reader [may know]."

"It gave us more of a sense of direction. The hardest part of a writing assignment is figuring out where to start."

Other Resources

Resources Link

The MEEN Writing Resources website includes:

DR1 Writing Guide (.docx)

- Note that this is a generic guide. You should prioritize your studio instructor's guidance and expectations.

Sample sections

FAQs about Writing in MEEN 401

Handouts on topics like Finding and Evaluating Sources, Integrating and Citing Sources, Genre and Style (tone, concise writing)

tx.ag/meenwritingresources

Assessment Strategies

FOR INSTRUCTORS

What are some common issues, problems, etc. we encounter when commenting on students' papers?

Instructor Challenges & Goals

CHALLENGES

- Grading writing is time-consuming
  - 1-3 hours of grading per report
  - About 22 reports per section
- Students don't always respond appropriately to feedback
  - Focus on minor, sentence-level edits
  - Avoid addressing complex organizational/content-based issues

GOALS

- Make grading more efficient
- Improve quality of feedback
- Improve grading consistency

Higher Order Concerns and Lower Order Concerns

Grading writing involves triage. In other words, instructors should identify and focus their feedback on the biggest issue in each report. This guides students toward making more effective revisions (rather than simply correcting superficial issues).

One way to help you identify big issues is to think about HOCs and LOCs.

Higher Order Concerns and Lower Order Concerns

HIGHER ORDER CONCERN (HOC)

Development of ideas

Use of evidence

Paragraph structure

Attention to audience

Fulfillment of purpose

LOWER ORDER CONCERNS (LOC)

Paragraph transitions

Citation formatting

Grammar and mechanics

Sentence structure

Word choice

(A LOC can become a higher order concern if it affects the reader's understanding of the report.)

TIPS & BEST PRACTICES FOR GRADING WRITING

Don't spend more than an hour per report (aim for 20-30 minutes)

- Your mileage may vary

Provide a summative note that identifies two or three areas of improvement

- Give the students a specific task or action item to complete during their revision
- e.g. "As you revise, focus on paragraph organization and eliminating wordiness from your report”

Limit yourself to 3 or 4 comments per page

TIPS & BEST PRACTICES FOR GRADING WRITING

Use complete sentences in your comments

- Avoid underlining, check marks, etc. unless you've explained what such marks mean
- Single word comments can be confusing

Remind the students that revisions are their responsibility

- Don't use track changes to edit the students' paper
- Tell them correcting everything marked doesn't result in a 100%

Grade by team – it's easier to focus on one topic at a time

Create a bank of commonly given feedback

TIPS & BEST PRACTICES FOR GRADING WRITING

Here are some examples of feedback that we incorporated into a comment repository (which we're happy to share)

- When using comparatives like "bigger" or "better," provide a point of reference and use quantitative data.
- This [concept/data] could be better explained using a [figure/table].
- You have multiple instances of [issue] throughout the report. I've marked this one for you. When you revise, you need to find and correct the rest.
- All sources in the references list must be cited at least once in-text.
- All sources cited in-text must correspond with an entry on the references page.

Acknowledgement

We'd like to acknowledge the MEEN Course Enhancement award for "Advancing Technical Writing Instruction in MEEN 401: A Dual Approach for Student and Faculty Development".

This work was presented at the following conferences:

- Jessie Cortez and Joanna Tsenn, "Writing Assessment Training for Capstone Design Instructors," The 2025 ASEE Annual Conference and Exposition, Montreal, Canada.
- Jessie Cortez and Joanna Tsenn, "Fostering Community and Interdisciplinarity through Writing Assessment Training," 2024 Association of Teachers of Technical Writing (ATTW), presentation.
- Joanna Tsenn and Jessie Cortez, "Writing Assessment Training for Instructors," 2023 Frontiers in Education (FIE) Conference, poster.

Thank you!

Please contact us if you have any questions, suggestions, or want to receive a copy of our sample introduction grading or comment repository.

Jessie Cortez, Lafayette College, cortezj@lafayette.edu

Joanna Tsenn, Texas A&M University, joanna.tsenn@tamu.edu