



# **Technical Writing Review**

## **MCHE 201 – Spring 2018**

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# Why should I care?



- If you can't communicate your ideas, they are worthless.
- Those that can communicate become bosses.

# First Questions to Ask



- What is the purpose of this document?

- Who is the primary audience?

- Technical competence
- Expectations
- Language skills
- Interests
- ...

Who are the customers and what do they want?

# What are we reporting?



- Present accomplishments/results
  - A design, prototype, device, etc *or*
  - New method, theory, or plan for solving a problem
- Do ***NOT*** present administration
  - We did this... Then, we tried that... Finally, we found...
  - Information on team meetings, etc

# General Guidelines



- Maintain consistent formatting

- Fonts
- Figure sizes
- Margins
- ...

**Your job is to make the reader's job as easy as possible.**

- Generally avoid 1st person

- Avoid chronological structure

(We did this... Then, we tried that... Finally, we found...)

- Revise 10x more than you think you need to

- Read aloud (or use computer speak-to-text)
- Writing is a very small part of **WRITING**

# ***It's a Team Effort!!!***



- Common mistakes:
  - Each person write a section, staple together = done
    - ◆ Inconsistent “voice”
    - ◆ Inconsistent formatting (fonts, spacing, etc)
    - ◆ Inconsistent terminology
  - One person writes the report, others design/build
    - ◆ Report won't match the design
    - ◆ Clarity comes with writing

# Typical Tech. Doc. Sections



- Abstract (or Executive Summary)
- Introduction
- “Main” Sections
  - Will vary by document/presentation type
- Conclusion
- References

# Abstract



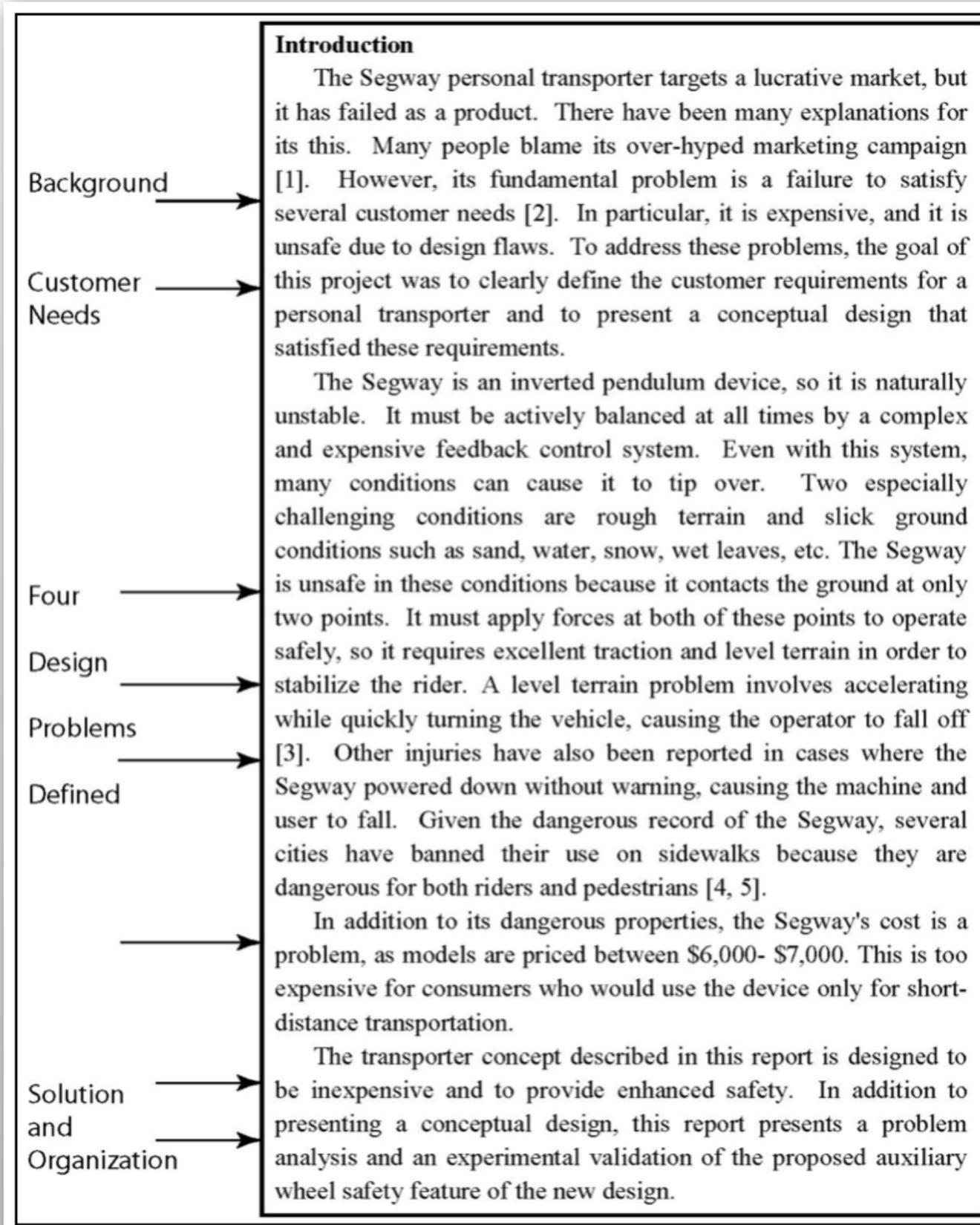
- Stand-alone document that summarizes the report
- An abstract:
  - Introduces the reason for the report (the problem being solved)
  - Presents high-level summary of the methods used
  - Summarizes *key* results

# Introduction



- What is the problem and why should your reader care?
- Includes
  - Introduction of the problem
  - Survey of relevant previous work
  - Why this prior work is insufficient to solve your problem
  - A “roadmap” for the remainder of the report
    - ex) The next section discusses... Then, in Section 3, ... Section 4 describes... Finally, conclusions are presented in Section 5.

# An Example Introduction



# “Main” Sections



- For design reports
  - The chosen/recommended design immediately follows the introduction
    - ◆ Overview first
    - ◆ Then, details
  - Then, support the decision to choose that design
- For method, theory, problem-solving reports
  - Logically present the method
  - Typically begin with simple case, then work to edge cases

# Final Design Section



- Present functionality of final design
  - Start with high-level overview
  - Move to lower-level details
  - No pro/con discussion here
- Use figures!
  - Label parts according to function
  - Dimension to give scale
  - At least one figure of each sub-system is recommended

# Problem Understanding Section



- Provides support for the choice of your final design
  - What are key customer requirements?
  - What are the key specifications that result from those?
  - What functionality must the design have?

This should sound a lot like presenting the:

- House of Quality
- Spec. Sheet
- Function Tree

# Concept Evaluation Section



- Further support for the choice of your final design
  - At least two other viable alternatives
  - Support selection of your design over these
- First, introduce the alternative concepts
- *Then*, evaluate the alternatives

# Concept Evaluation Section



- Further support for the choice of your final design
  - At least two other viable alternatives
  - Support selection of your design over these
- Introduce the alternative concepts
  - “True” alternatives
  - Enough detail to understand functionality
  - Figures!
  - No pro/con discussion

# Concept Evaluation Section



- Further support for the choice of your final design
  - At least two other viable alternatives
  - Support selection of your design over these
- Introduce the alternative concepts
- Evaluate the alternatives
  - Include chosen design
  - Reference the evaluation matrix
  - The main idea of this section... “The final design was chosen because it was good at A, B, and C, even though other alternatives were better at X, Y, and Z.”

# Conclusions



- Very “abstract-like”
- Summarizes what was presented
  - No *new* information!
  - Reiterate the reason for the report (the problem being solved)
  - Presents high-level summary of the methods used
    - ◆ 1-2 sentence overview of the design
    - ◆ Summary of tools used and key cust. req.
  - Include a summary of *key* results

# Writing about the Design Tools



- Avoid parenthetical citation/reference. Use:
  - ... as seen in Figure X.
  - ... shown in Figure X.
- Present them as *fact*.
  - Not, “We believe...” or “We found...”
  - “The most important customer requirement is...”
- Point out what’s important. What is unique to *your* design?

# Good or **Bad**?



The House of Quality (Figure 1) was filled in using properties of the tower as well as demands for and desired abilities of the tower and the instructions needed to build it. The requirements of the customer and the requirements of the tower to function were separated. Each of the customer requirements were given weight, a value of importance, and a value that shows how strongly each customer requirement and functional requirement correspond. From this the relative weight was calculated and the time and materials the team needed to invest in each functional requirement was determined.

This is *way* too general.

# Good or Bad?



The House of Quality in Figure 1 shows the relationship between customer requirements, their relative importance to the customers, and engineering characteristics. From the House of Quality, the primary areas of focus for this design are making a simple design to build, choosing the appropriate number of structure legs, and maximizing leg length. The top of the House of Quality in Figure 2 shows the relationship between the engineering characteristics. For example, while maximizing the number of legs would be beneficial to creating a more balanced structure, it had a strong negative correlation with tower weight, which was to be minimized.

Still not perfect, but much better.

# Writing about Designs



- Avoid parenthetical citation/reference. Use:
  - ... as seen in Figure X.
  - ... shown in Figure X.
  - Figure X is a drawing...
- *Exactly* match text to figure labels
- Avoid referencing other designs to explain the current one

# Matching the Text and Figure



## Design Overview

1) Citation &  
2) Objective

3) Description via citation of labels

A sketch of the proposed human transporter is shown in Figure 2. The device rolls on two large **powered wheels**; a third **stabilizing wheel** is deployed from the front **handlebar stem** when the vehicle speed falls below a threshold value. This wheel travels up and down in a slot located in the handlebar stem. A **seat** is mounted between the wheels. **Height adjustment** controls give the user control over the seat and handlebar stem, and a **width adjustor** allows the user to modify the handlebars. The vehicle is stabilized by a controller using gyroscopic sensors [3], allowing the user to control forward motion by simply leaning forward.

4) Explanation

This design offers several safety enhancements over the Segway. The forward stabilizing wheel prevents the vehicle from falling over in the event of a user error or a mechanical error resulting in sudden loss of speed. The use of a seated operator lowers the system's moment of inertia; any risk of injury due to falling forward is also reduced because the system potential energy is low. The seat height and the handlebar position can be adjusted by the operator; the adjustment knobs are represented on Figure 2, and two-sided arrows illustrate the potential motions.

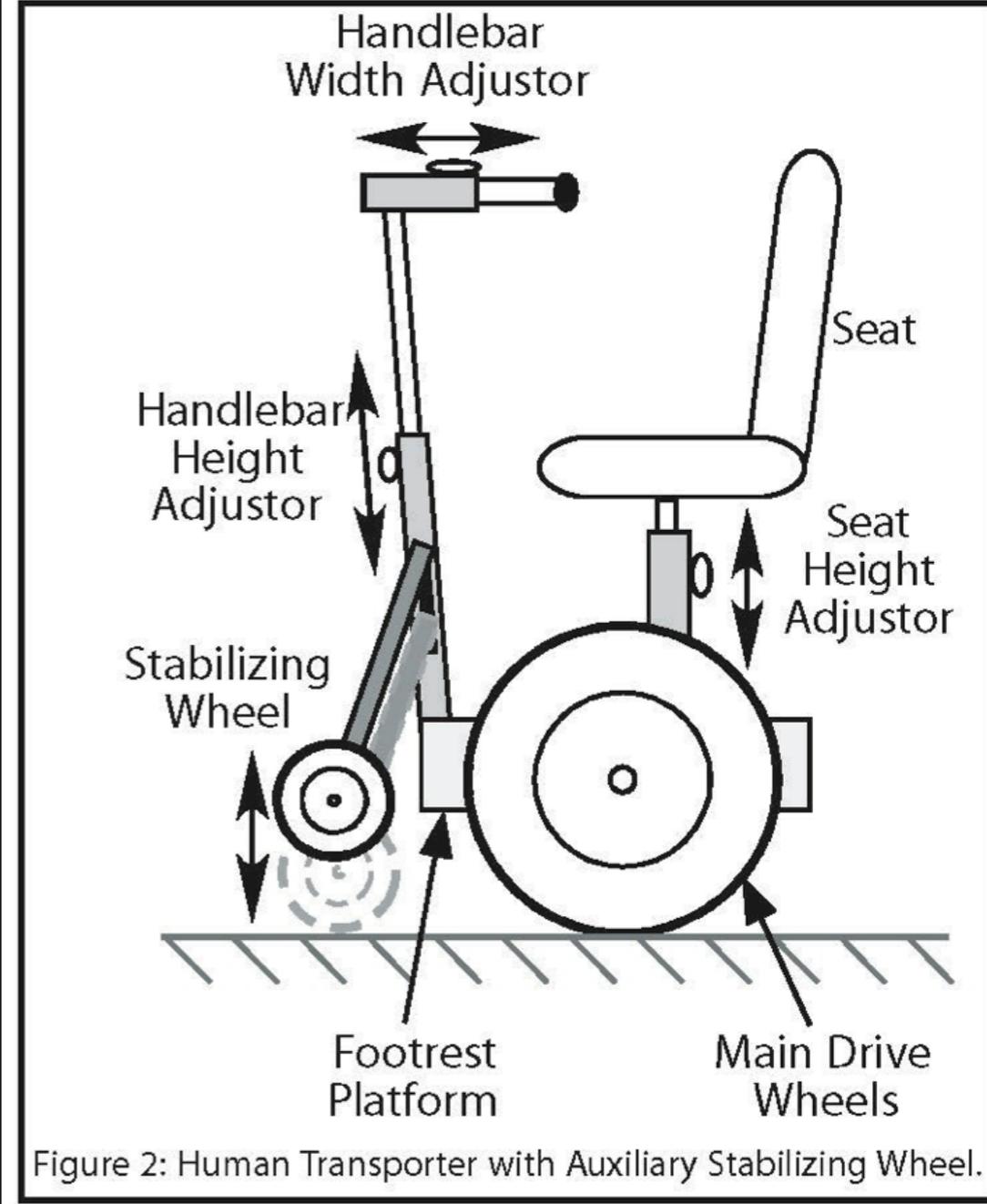


Figure 2: Human Transporter with Auxiliary Stabilizing Wheel.

# Writing Tools



- Template is provided on the course site
  - Example pdf
  - overleaf.com template
    - ◆ Collaborative LaTeX document generation
    - ◆ Has WYSIWYG mode
- Word, Google Docs, *etc.* all also work
- Pre-submission checklist also on the website