How to Write Short Reports for 6.033

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February 7, 2003

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Writing Weekly Reports

- Why write them
- How to write them
- How to make them better

Why write short technical reports?

- Professional “real world” communication
  - Efficient
  - Persuasive
- Not knowing how to write **directly** and **concisely** can have deleterious consequences

How do you write short reports?

Steps in Writing

1. Read and Understand the Assignment
2. Brainstorm
3. Construct a coherent thesis
4. Develop ideas with evidence
5. Organize logically
6. Revise
7. Edit—lean, readable prose

Read and Understand the Assignment

- What does it want you to do?
- Identify topic and scope
- Identify key words
  - Summarize
  - Analyze
  - Compare

This Week's Assignment

Lessons learned from the Therac-25 accidents serve as a dire warning of the severity of human casualty due to machine failures. The inventors of the Therac-25 made several decisions on both the level of hardware and software. Can you identify a decision that is critical to the malfunctioning of the machine? What would you do differently to prevent the same kinds of errors from happening?

Topic, Scope, Keywords

- Lessons learned from the Therac-25 accidents serve as a dire warning of the severity of human casualty due to machine failures. **The inventors** of the Therac-25 **made several decisions** on **both the level of hardware and software**.
- Can you **identify** **a decision** that is **critical to the malfunctioning of the machine**?
- What would you **do differently to prevent the same kinds of errors** from happening?

- **a (=one) decision**
  - What is the key decision?
  - Why is that important to the malfunctioning of the machine? What kind of errors did that decision cause?

- What would you **do differently to prevent the same kinds of errors** from happening?
  - An tangible action or design change
  - Related to the decision

Construct a coherent thesis

- State your argument in one sentence.
  - **Example:** The Therac-25 programmer's decision to reuse code in the development of the system meant that Therac-25 did not undergo rigorous testing.

Develop Evidence

- Make the points obvious
  - Simple language
  - Concrete, compelling evidence
  - “So what?”
- Start with the most important points
- Chunk information into manageable bits
- Move between generalizations and examples

Develop Evidence

Example: The software developers assumed that using off-the-shelf software would increase safety because that software would have been thoroughly tested. For example, Therac-25 used modified software from Therac-20 to handle the dual mode of X-rays and electrons. . .

Organize logically

- Readers expect the following organization:
  1. **Introduction** = State your point
  2. **Body** = Prove it
  3. **Conclusion** = Summarize argument + recommendations

Organize this Week's Assignment

- Introduction
  - Thesis that identifies the key decision and why that decision was significant
- Body
  - Evidence to support that thesis
  - What kind of errors did that decision lead to?
- Conclusion
  - Recommendations on how to prevent the same kinds of errors from happening

Revise for Clarity

- Do you answer the question?
- Do you have a thesis?
- Do you have appropriate examples?
- Is each example sufficient evidence?
- Are counter-arguments considered?

Revise for Clarity

- Delete “empty” introductions
  - **Example**: Very important lessons may be learned from the Therac-25 accidents.
- Avoid argument via restatement:
  - **Example**: The primary reason that Therac-20 killed far fewer people than Therac-25 was that Therac-20 had hardware interlocks. These hardware interlocks were not on Therac-25. Hardware interlocks made Therac-20 safer.

Edit for lean, readable prose

Avoid:

- stock phrases
  - "In today's society . . ."
- clunky constructions
  - "The reason is because . . ."
- vague phrases
  - "This shows . . ."
- slang
  - "They fried people."

Avoid clunky constructions

- **WEAK**
  Significant are the Therac accidents.

  The reason that the Therac-25 failed is because it did not have hardware interlocks

- **BETTER**
  The Therac accidents are significant.

  The Therac-25 failed because it did not have hardware interlocks.

Avoid the “naked this”

- **WEAK**
  Programmers often view code reuse as an excuse to avoid testing and documenting particular parts of a system. **This** can allow minor bugs to go undetected.

- **BETTER**
  Programmers often view code reuse as an excuse to avoid testing and documenting particular parts of a system. **This improper reuse** can allow minor bugs to go undetected.

Active vs. Passive Voice

- **WEAK**
  The errors were not documented. *(Passive)*

  I think that this design is problematic. I think they could have improved the system by . . . *(Active—overuse of personal pronouns)*

- **BETTER**
  The engineers failed to document the errors. (*Active)*

  The engineers could have improved the design by . . . *(Active)*

Verbs vs. nominalizations

Verb	**Noun**
Discover	Discovery
Investigate	Investigation
React	Reaction
Fail	Failure

- Verbs forms are stronger
  WEAK: Expectation of system failure
  BETTER: Expecting when systems will fail

One-Page Format

- Word processed
- Your name, the name of your recitation instructor, & your section meeting time at the top of the page.
- 11 or 12 point font
- Enough leading (vertical space between lines) so that graders can make comments.
- The entire assignment should fit on one side of one sheet of paper.

Writing Help

- Model papers on 6.033 website
- Writing Center
  web.mit.edu/writing
- Writing practica
- *Mayfield Handbook of Technical and Scientific Writing*