The Mechanics of Writing in Science

Steven Tuckey
MSU Writing Center

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Writing Services Available

- Graduate School workshops
  - Dissertation writing and formatting
  - Navigating the Ph.D. Writing Workshop
  - Outside speakers
- Writing Center
  - Graduate writing groups
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The MSU Writing Center

Locations:
- 300 Bessey Hall
  - 9-5, Monday – Thursday
  - 9-2, Friday
  - 432-3610 for appt.
- Main Library
  - 3-10, Sunday – Thursday
- [http://writing.msu.edu](http://writing.msu.edu)

Observations and Ideas

- Aspects most frequently questioned in scientific writing consultations
  - Clarity
  - Editing
  - Reference
  - Tables/Figures/Equations
Mechanics of Clarity

Don’t write merely to be understood. Write so that you cannot possibly be misunderstood. – Robert Louis Stevenson

- Is it absolutely clear what “this” or “which” or “the latter” refers to?
- Have you used similar words appropriately? (“Mutant” is not the same as “mutation”)
- Have you used many words when one is enough? (“In the case that” instead of simply “if”)
- Peer edits are critical for testing clarity

Mechanics of Editing

- MS Word has terrific editing capabilities
  - Make comments for yourself and other draft readers to elicit later help
  - Edit using the Track Changes feature (in “Tools” menu) to keep track of additions, deletions and alterations
- Maintain a “discard file” for every document
- SciPROOF (http://www.sciproof.com/main.shtml) expands the dictionary and incorporates scientific writing style checker
Mechanics of Reference

- Using reference/citation management tools (i.e. Endnote) can cause troubles
  - Field codes inflate document size and can disrupt (slow repagination, disappearing text, corrupt) files sent to publishers
- To eliminate all field codes (and maintain formats and content): Select all text (CtrlA), then simultaneously hit CtrlShiftF9
- Knowing when and who to cite – based on journal or audience

Mechanics of Tables/Figures/Equations

- Numbering? Use Word’s Index and Tables feature ("Insert" → "Reference")
- Word’s Equation Editor
- Word’s Master Document feature
  - Works like a dynamically linked database document
  - Good for large documents (dissertation or book), but can be clumsy
Valuable External Sources

  - Robert A. Day
  - Oryx Press
  - ISBN: 0897749898

- *The Craft of Scientific Writing, 3rd Edition*
  - Michael Alley
  - Springer
  - ISBN: 0387947663

- *The Art of Scientific Writing: From Student Reports to Professional Publications in Chemistry and Related Fields, 2nd Edition*
  - Hans F. Ebel, Claus Bliefert, William E. Russey
  - Wiley-VCH
  - ISBN: 3527298290

- *How to write a paper in scientific journal style and format*
  - [http://abacus.bates.edu/~ganderso/biology/resources/writing/HTWtoc.html](http://abacus.bates.edu/~ganderso/biology/resources/writing/HTWtoc.html)

Steve’s “Crazy” Hypothesis

Examine a practice—what we do, how we do it, why we do it, and how others see it—is as reasonable a method for improving scientific writing as it is for improving experimental procedure.
A Few Interesting Aspects of Scientific Writing

- The removal of the narrator from the ‘story’ (i.e. we don’t say “I added 50 ml,” but instead say “50 ml was added”)
- The transformation of verb into noun (i.e. refract becomes refraction)
- Establishment of technical ‘jargon’
- The expansion of context within the community (i.e. the experiment becomes replicable by anyone… with the right “tools”)

Historically developed for the purpose of convincing…

“Convince” With “Evidence”

- The “science” we practice is a historically recent phenomenon
  - Use of validity and generalizability
  - Mathematical modeling and statistics
  - Logical argumentation (analytic) coupled with empirical evidence
- Even so, scientific communities are dependent on human communication
Rhetoric may be defined as the faculty of observing in any given case the available means of persuasion. –Aristotle

Rhetoric & Logic

Frequently considered separate

More reasonably integrated
A Case for Rhetoric

Underlying all of natural science is a rather remarkable understanding, albeit one that attracts relatively little attention: Everything measured, detected, invented, or arrived at theoretically in the name of science must, as soon as possible, *be made public* – complete with *all the details*.

Ebel, Bliefert & Russey, in *The Art of Scientific Writing: From Student Reports to Professional Publications in Chemistry and Related Fields*

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Kinds of Writing in the Sciences

- Journal publications
- Dissertation writing
- Books and popular media
- Curriculum vitae
- Presentations and colloquia
- Laboratory notes/logs
- Correspondences with colleagues
- Committee/“Official” documents
- Syllabi and teaching materials
Differences in “genres”

- Situation
- Audience
- Purpose

Situation

- Finding ways to get started – “Know thyself”
  - Clear your desk and/or computer desktop (no games?)
  - Stocking your writing area with a supply of snacks
  - A "Do Not Disturb!” sign on office door or back of chair
  - Make a schedule for start/finish of each subtask
  - Take care of any urgent physical needs
  - Listen to some relaxing music
  - Create a peer writing group that you are answerable to

- Awareness of what your walking into – “Know thy enemy”
  - Tweaking word processor styles to match journal
  - Talk with others (email editors) about journal specs
  - READ!! Participate in the larger community
  - Never send/submit when you’re done, only when the writing is done
Audience

- Consider the audiences of the different writing tasks
  - Why are they reading?
  - What are they looking for?
  - Which aspects are most important?
  - What counterpoints or alternative hypotheses are reasonable to expect?

Purpose

- Within the community?
  - Increasing knowledge base
  - Verification/Improvement of prior work
  - Funding
  - Professional advancement
  - Establishing affiliations
  - Education (yours or others’)
  - Application
- Outside the community?
  - Building new disciplines
  - Political capital
  - Application
Where does that leave us?

- Writing, and therefore science, is an inherently rhetorical practice of communication, argument, persuasion, and justification.
- Be aware of the situation, purpose, audience, and form for your writing.
- But go further... use your awareness to improve all your writing tasks.

Questions?

Steve Tuckey – tuckeys1@msu.edu