

Writing in the Sciences

WAC/Practical Pedagogy mini-
Workshop
2/24/2010

**Writing Critically requires that students ‘think’
critically. What does it mean to think
critically?**

- Locate and evaluate sources/evidence effectively
- Identify and make sound, logical arguments
- Draw reasonable conclusions
- Understand and evaluate others’ points of view

Sample Assignment aimed at developing Critical Thinking Skills:

Using the hand-out of real research abstracts (e.g. Seligman & Beagley (1975) and Seligman & Groves (1970)) distributed on paper during class, work with your group to complete the following:

- 1) For each study identify the ethical violations.
- 2) Conduct a cost/benefit analysis.
- 3) If possible, make suggestions for alternative, ethical methods for studying the same phenomena.

Formal Writing Assignments – an assignment that requires a polished, finished product.

The traditional term paper assignment does not guide students toward formulating a problem, developing a thesis, nor stimulate complex thinking.

- Identify the learning goals of the assignment. What exactly is the purpose of the assignment? Take extra care in writing the assignment. Include explicit directions for successfully completing the assignment.
- Provide guidance. Scaffold the process. Design assignments to develop top-down organizing and planning.
- Vary audience, rhetorical context, writer's role, purpose, or format.
- Explain how the final product will be graded. Share rubrics.
- Incorporate Peer Review Processes
- Require Revision.

Sample Formal Assignment:

Write a 10-page paper in APA format addressing a specific question from the field of neuroscience. For example, one might ask the question, “Which treatment is more effective for ADD, medication or behavioral therapy?” Your paper should include a critical review of primary source literature on your topic. Your paper should be written in language that a fellow student would easily understand. Additional guidelines and due dates will be given to you in class.

Step-wise Process and Assignment Guidelines:

Step 1: Write down several questions, from the field of neuroscience, for which you would like to know the answers. Dr. Carroll will review your questions and provide written feedback on the best possible questions to investigate. (Due early in the semester).

Step 2: Using **primary** literature sources (articles from refereed journals), research the answers to your question. Do **NOT** use any non-verifiable internet sources. Organize typed summaries of journal articles, a typed reference list, and an outline of the material to be discussed in your paper. You will receive written feedback. (Due @4 weeks into the semester).

Step 3: Type the answer(s) in a 10-page paper in APA format. The paper should be written for yourself and/or a fellow student. Assume that the reader has a very limited knowledge of the field. Use language and explanations that a fellow student would understand, rather than complex scientific jargon that only an expert would understand. In seeking an answer to your question, critically evaluate contradictory information, and draw conclusions that are supported by the evidence included in your paper. (First Draft due at midterm; revised paper due at week12).

**Informal Writing Assignments – unfinished, exploratory writing
(unstructured, personal, freewriting).**

- Writing is used as an exploratory tool to clarify one's own thinking.
- Sample Assignments: Journals, Letters, emails, portfolios, practice essay exams.
- Explicitly state your expectations.
- Provide guidance on the process (e.g. semi-structured journals). Develop questions appropriate to your discipline.
- Write during class time. This often works to stimulate discussion.
- Carefully consider how to grade informal writing. Check marks? Grade effort and level of thinking rather than content? Grade number and length of entries in a journal?

Sample Informal Assignments aimed at developing Critical Thinking Skills:

Assignment Directions: Identify the reasons and conclusion. Then identify the words and phrases that are ambiguous in the reasoning structures and explain why the ambiguity matters.

Walter: How do you know that paranoid schizophrenics are capable of behaving at extremely high levels of creativity when they have the disorder?

Jim: I saw it happen in the movie, A Beautiful Mind. The main character won a Nobel Prize even though he was a paranoid schizophrenic. It's a great movie, and I heard that it was based on a true story.

Assignment Directions: Suppose the activity of a neurotransmitter named "DAC" has recently been found to be involved in the hypothetical disorder SCSUITIS. Design a drug to increase activity of neurotransmitter (NT) 'DAC' in the synapse. Give your drug a name and be very specific in explaining the mechanism your drug will employ to increase NT 'DAC' activity. [PAGE LIMIT = 1 PAGE] (10 points)

Elements of Good Assignments:

- Have a Specific Learning Goal or Purpose in mind when designing an assignment.**
- Provide detailed instructions of what students have to do to complete an assignment.**
- Provide examples of quality work.**
- Comment on early outlines or drafts.**
- Break a large writing assignment into several smaller assignments.**
- Specify the audience and their level of expertise.**
- Use Rubrics or other methods to clearly communicate your expectations.**
- Ask students about their own writing processes.**
- Provide Substantive Feedback.**
- Require Revision.**

Skill-building Strategies:

*** Write with your students.**

For some assignments, e.g. learning to summarize a journal article, students really benefit from reading your summaries.

Skill-building Strategies:

❖ **Have your students engage in metawriting tasks.**

Ask students to write about their thinking and writing processes. I often have students read formal research reports and have them 'identify how' the author formulated a hypothesis, reviewed the literature, stated the problem, etc. The students write about the structure of the paper, not the content.

Skill-building Strategies:

* **Share your own Writing Process.**

Many students think faculty can write a paper in perfect shape for publication in 10 minutes or less. Share original drafts of manuscripts, the revised versions, as well as reviewers' comments with students to show them that writing is a "process" for everyone. Rewriting a paper is a way to further develop ideas.

Skill-building Strategies:

- * **Ask students to reflect on their own writing.**

Have students complete a rubric with their assignment submission. I ask students to also identify their strongest and weakest objectives. I then enter my comments and ratings on the same rubric. We then discuss any differences when the papers are returned.

Writing Assignments Grading Rubric. Fill out the essay rubric with each class assignment. Add comments to the two objectives you feel your paper demonstrates well and the two objectives you most need to improve. Ways this paper can go wrong: copying information directly from the text or class notes (even with proper citations); relying on internet sources and failing to consult the relevant assigned sources; a superficial discussion of the topics.

Objectives & Expectations	Needs Work	Fair	Good	Objective Met	Comments & Suggestions
Structure/Content					
Clear summary or conclusive statement.					
Specific, relevant evidence included.					
Paper sticks to topic and develops it.					
Smooth connections between ideas.					
There is more analytical than descriptive material.					
Style					
Keep it simple. Writing is parsimonious.					
Tone and word choices are clear and appropriate for the specified audience.					
Sources are integrated smoothly into the discussion.					
Organization					
Paragraphs are organized to create coherence for the reader.					
Arguments are logical and clear.					
Paper does not use repetition except for clarity.					
Mechanics					
Grammar is correct.					
Punctuation is correct.					
Spelling is accurate.					
Paper adheres to APA formatting conventions					