Algebra the Write Way- Module 1
Integrating math/quantitative reasoning into Intro to Essay Writing course

Suggested levels: High school grades 11-12 or developmental college English

Subjects of Integration: Math & English (Intro to Essay Writing)

Math Skills: For Essays 1 & 2, the students only need an understanding of basic percentages; for Essay 3 the math level varies for the Ethnomathematics topics selected in the readings (our students were only at the Elementary Algebra level).

Overview: This module consists of writing assignments that were taken from a learning community course in which we integrated two college-prep courses, Elementary Algebra and Intro to Essay Writing. The assignments use mathematics and quantitative reasoning as topics for readings and essays for the English class with the purpose of increasing the students’ interest since the mathematics is concrete and related to their lives.

Outline of Activities in Algebra the Write Way- Module 1:
1. Journal Instructions and Overview
2. Math Autobiography
   a. Journal Prompts leading to composition
   b. Writing assignment
3. Essay #1: Argument for or against more emphasis on quantitative literacy in schools
   a. Readings and Journal Prompts from Radical Equations and Mathematics and Democracy
   b. Essay Assignment
4. Essay #2: Position paper for or against the building of a Walmart store with quantitative support.
   a. Readings and Journal Prompts on readings included in Chapter 5 of the English text.
   b. Essay Assignment
5. Essay #3: Explanatory Thesis on the topic of Ethnomath
   a. Readings and Journal Prompts on handouts on Amerindians, Ancient Egypt, India, Maya cultures
   b. Essay Assignment
Instructor Notes: This journal overview was given at the beginning of the quarter to inform students about the journal they would each be writing. The overview gives some basic objectives and guidelines. The students were given several pre-writing journal prompts for each essay; the journal prompts are given in the instructor notes for each of the following writing assignments.

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**Your Math Journal**

Each student is expected to keep a journal for this course. Your journal will be a place where you will use writing to articulate and process some of your questions and insights during the quarter. To receive maximum points for your journal, you must respond fully, carefully and thoughtfully to each of the prompts listed on the "Journal Assignments" handout. On the days that journals are due, you will submit the entries that are assigned for that collection at the start of class; *late submissions are not acceptable*. Journal entries should be submitted on ordinary 8 1/2" x 11" paper which is (or can be) punched for placement in a notebook.

**Objectives:** There are many benefits that can come from keeping a journal. Your writing will improve as you practice and receive feedback. Many of the journal exercises have been created to improve your understanding of the mathematical concepts. The connection between the mathematics and writing will become clear as you complete these assignments. Furthermore, the journal will be an opportunity for you to do some self-assessment and reflection on your learning. We also hope that the journal will be a method for students and instructors to communicate and give feedback.

**Assessment:** For each journal entry, one or both of your instructors will assign you a score. The maximum points for each entry are shown on the list of journal assignments.

**Guidelines:**

*Be sure to follow the general guidelines for how much you are expected to write for each prompt (we've indicated these general expectations next to each journal prompt in the Journal Assignments handout), but please know that length itself is not a measure of quality.* Your genuine interest and engagement in the question is far more significant than length of your entries.

- Respond to each prompt on a separate piece (or pieces) of paper. (However, you can answer more than one "math" questions on a page.) Be sure to pay attention to all parts of the prompt.
- At the top of the page, write out at least a short version of the prompt you are responding to, your name and the date.
- In a journal, the writer's main goal is to articulate and process thinking processes. However, as this is a writing class, we will expect you to follow conventions of standard English. You need to use complete sentences and paragraphs. It is acceptable to use an occasional mathematical symbol, but you should not use symbols in place of prose to explain yourself.
- Regard your classmates as the audience for your writings in this journal unless the assignment specifically asks you to do otherwise.
- You should type or neatly hand-write your responses.
Instructor Notes: This handout was given at the beginning of the quarter to help the students begin to formulate a thesis. Developing a thesis and organizing the essay around the thesis was one of the main objectives of the Intro to Essay Writing course.

How to Formulate a Thesis

1) Name your focus topic: ____________________________
   E.g. Quantitative literacy

2) Ask a question about your focused topic: ____________________________
   E.g. Is quantitative literacy necessary for success?

3) Turn your question into a declarative statement: ____________________________
   ____________________________
   E.g. Quantitative literacy is necessary for success in today's workforce.

4) Add a group of words that summarize the key ideas you will cover:
   ____________________________
   ____________________________
   E.g. Quantitative literacy is necessary for success in most jobs today because confidence with symbolic reasoning enables people to be ongoing learners as technology keeps changing, ensures that people can effectively manipulate numbers for business situations, and helps people communicate accurately and efficiently with others.

5) Recognize the opposition. ____________________________
   ____________________________
   ____________________________
   E.g. Although the goal of ensuring people are numerate as well as literate will involve a lot of money and effort, ...

6) Call upon editing to put it all together: ____________________________
   ____________________________
   ____________________________
   ____________________________
   E.g., Although quantitative literacy for everyone will be a costly goal for our society to pursue, it is necessary because quantitative literacy will help ensure that people are prepared to keep learning about, communicate about and manipulate concepts and equipment in workplaces that are dominated by computers.
Instructor Notes: This assignment sheet describes the student’s first writing assignment: a math autobiography. The math autobiography is a personal story of a student’s math educational history and it provides the instructors with information about the students in the course. This exercise also helps open a dialogue between the student and instructor. Also, the math instructor has found that students who are enrolled in below-college-level math courses in college often have poignant experiences that negatively affected their progress in mathematics. For many of the students in the course, this was their first college math course. According to Preis & Briggs (2001), writing a “math autobiography” can be helpful in reducing math anxiety. Some students find it therapeutic to identify why they have low self-confidence or a negative attitude about mathematics before starting their college math courses. Although not all of the students’ memorable experiences were negative, reflecting on their past helped students consider what works best for them to learn mathematics.

Pre-Writing Journal Assignments: The following journal prompts were assigned on successive class days leading up to the composition of the autobiography.

Math Autobiography Prompt 1: Write about your encouraging memories/experiences with math.

Math Autobiography Prompt 2: Write about your discouraging memories/experiences with math.


Math Autobiography Assignment:

Specifications: Your essay should be roughly 2-3 pages long, contain at least five paragraphs, and follow manuscript form (see separate handout for a description of manuscript form).

Purposes for this assignment:
1) for you to practice writing a formal, academic essay on a topic that is personal and familiar;
2) to help you analyze the significance of your background with quantitative literacy;
3) to encourage you to think about the value of quantitative literacy in your life (past, present and future);
4) to help your instructors get to know a little about your background as a math student.

Assignment: Write a thesis-driven essay that incorporates concrete details about your personal experiences with math and answers one of the following questions:

• How have my experiences with math influenced who I am today?
• How has my background with math affected the quality of my life?
• Why have I had success or lack of success in my history with math?

For this essay you will first need to reflect on your past and present experiences with math, math classes, or math teachers. Then, you will analyze your personal history by questioning the significance of these experiences. When you develop your analysis in a formal essay, you should describe or at least mention one or more specific events, teachers, or experiences to help explain how math has influenced you.

Thesis/Paragraph topics: State your thesis (overall, unifying idea) in your opening paragraph; it should answer one of the above questions about the effects or causes of your experiences with math. Your body paragraphs should explain how your experiences with math relate to who you are. Use your concluding paragraph to sum up how your analysis of your personal history with math has influenced your current thoughts about the significance of math for your life. (There will certainly be more than one way to wrap up your essay, but your conclusion should not introduce new information.)

Assessment:
I will use the rubric that you attach to your paper to help me determine your grade (this rubric will be distributed as a separate handout). Please make sure your paper is typed according to manuscript guidelines. For Essay #1, the look of your paper will be a large factor of your grade.

Sample Essays:
See Behrens pp. 272-273 ("Health Clubs" by Maria Rodriguez); 229-231 ("You can Count on Miracles" by Aphonetip Vasavong); 310-311 ("The Harmony of Life" by Michael Jacobsohn)

You'll note that these student essays weren't written in response to a question about the writers' personal history with math, but each of them recounts and explores how one or more specific experiences in the writers' pasts shaped them or stayed with them, for better or for worse. You could consider whether any of the approaches these students took could be adapted for your essay. It can be useful to imitate someone else's general strategy when writing an essay, but I want to be very clear that that does not mean you are allowed to use their words or ideas, or that it's okay for you to pretend to be someone you're not. Stay true to your personal voice and your genuine understanding of the topic about which you're writing. Not only will you avoid plagiarism (a major 'no no' in academia), but your writing will be far more interesting and effective (= better grade!) if your essay's voice and content are authentically yours.
Prewriting and Outlining for Writing Assignment #1 (Math Autobiography)

I. Introductory Paragraph
Engaging introductory comments [Don’t start with overly general/obvious comments such as “Everyone has had experiences with math in his or her history…”]

Your thesis statement

II. Body Paragraphs [I’ve included prompts that might be useful for developing topic sentences. You can see if one of these sets of prompts would work for you, but you are NOT obligated to use these. DO make sure each body ¶ has a clear, distinct focus that relates to your thesis.]

Approach #1
¶ 1: 1st experience and its impact on me: ______________________________
¶ 2: 2nd experience and its impact on me: _______________________________
¶ 3: 3rd experience and its impact on me: ______________________________

OR Approach #2
¶ 1: One reason for my current relationship with math is_______
¶ 2: A second reason for my present attitude about math is_______
¶ 3: A third reason I feel the way I do about math today is_______

OR Approach #3
[For this approach it might also work to describe the specific experience in your introduction, then use 3 body paragraphs to describe the impact of that single experience.]
¶ 1: A specific experience I had with math when I was age ___ is _____
¶ 2: The short term impact of this experience was_____ 
¶ 3: The long term impact was_____

OR Approach #4
[For this approach also it might work to describe or explain your metaphor in your introduction, then use three body paragraphs to describe the impact of the metaphor.]
¶ 1: A metaphor that describes my relationship with math is_______
¶ 2: One way the metaphor helps to explain my relationship with math is_______
¶ 3: Another way the metaphor explains my history is_______

III. Concluding Paragraph
E.g.: Reflecting on my personal history with math has helped me see… and has inspired me to__________________
Instructor notes for Essay #1: Below is the assignment sheet for the first essay.

Related Readings/ handouts:

Journal Prompts leading to essay #1: The following journal prompts were assigned as homework leading up to the composition of the essay.

Prompt 1: Choose 3 quotes from the “Radical Equations” handout, write them out in the left column of a two column page, and write brief commentaries for each quote in the right column.
Prompt 2: Write a 250 – 300 word summary of the “Radical Equations” handout.
Prompt 3: Write a 250 – 300 word summary of the “Case for Quantitative Literacy” handout.
Prompt 4: Write a 250 – 300 word formal critique of the “Case for Quantitative Literacy” handout.

Essay #1: Argument for or against more emphasis on quantitative literacy in schools

Assignment: In response to one or both of the articles you have summarized and critiqued in this class (by Moses or Steen), you will defend a thesis for or against more emphasis on quantitative literacy in elementary schools, secondary schools and/or American (or another specific) society in general. You are expected to cite at least one of the articles using parenthetical in-text citation(s) according to MLA guidelines as we’ve practiced in class, and a Work(s) Cited list must be included at the end of your essay.

Length: 2-3 pages, double-spaced, word-processed following manuscript form

Notes: To defend your thesis I recommend that you think of your paper as containing three main parts. In Part 1, your task is to introduce and present your thesis. In this section, in addition to the ideas presented in Chapter 5 of our text, it might make sense to include a summary and/or critique of the articles. In Part 2, the longest part of your paper, you will present several distinct reasons for your position. Usually it works best to separate your reasons by paragraph breaks (which does not mean that you are limited to one paragraph per reason—one or two reasons might be longer than others). Part 3 is the conclusion—use the ideas in our text to wrap up your paper effectively.

Don't forget that you are invited to visit the Writing Center for help at each stage of the writing process.
Instructor notes for Essay #2: Below is the assignment sheet for the essay.

Related Readings/handouts:
“Ban the Bargains.” by Bob Ortega. Taken from *A Sequence for Academic Writing* by Behrens.

Journal Prompts leading to essay #2:
Prompt 1: Do Ex. 5.1 (pg. 179)
Prompt 2: Do Ex. 5.2 (pg. 182)
Prompts 3 & 4: Choose 2 quotes from the assigned reading in Chapter 5 of the Behrens text, write them out in the left column of a two column page, and then write brief commentaries for each quote in the right column
Prompt 5: Do Ex. 5.5 (pg. 199)

Essay #2: Argumentative Essay on Wal-Mart or commercial planning

Assignment: Write a 2-3 page essay in which you
1) take a position on one of the two topics below,
2) refer to at least two of the readings included in Chapter 5 of the Behrens text (184-209) on the Wal-Mart debate or that are distributed in class,
3) demonstrate at least two uses of quantitative literacy to support your thesis.

Possible Topics:
1. Lynnwood/north Puget Sound area should resist the building of another Wal-Mart store in the area. (Choosing this topic would involve arguing for a view that opposes the position taken by the writer of the essay included in Chapter 5.)
2. Commercial planning (zoning) in the north Puget Sound rural areas (you may name a specific town or community) should/should not be controlled carefully by citizen and local government groups to ensure that neighborhoods and community spirit are respected and preserved. (You may take either position.)

Organizing your Paper:
On page 201 of our text the editors discuss two general strategies for organizing an argument essay. I want you to follow the second strategy which they refer to as two sides of a controversy. Here is a broad-stroke outline template you might follow:

1. Introduction: Set the scenario for the controversy with some background information. You may refer to the articles included we've read related to this issue. Lead into your THESIS.
2. Present a strong, viable opposing view to your thesis.
3. Concede or rebut the opposing view you've just articulated.
4. Develop your own position (the pro side of the controversy)
   i. Reason or claim #1
   ii. Reason or claim #2
   iii. Reason or claim #3
5. Conclusion. Restate your position.
Instructor notes for Essay #3: Below is the assignment sheet for the essay.

Related Readings/ handouts:
A Sequence for Academic Writing by Laurence Behrens et al.
Chapters from McCleish (1991) book: The Amerindians and Number, The Maya, The Indian Love Affair with Number, Ancient Egypt, the Arabs: Renaissance of Number and Science

Journal Prompts leading to essay #3:
Prompt 1: Choose 1 quote from the Ethnomath handout on Amerindians, write the quote out in the left column of a two column page, and write a brief commentary for each quote in the right column.
Prompt 2: Choose 1 quote from the Ethnomath handout on Ancient Egypt, write the quote out in the left column of a two column page, and write a brief commentary for each quote in the right column.
Prompt 3: Choose 1 quote from the Ethnomath handout on India, write the quote out in the left column of a two column page, and write a brief commentary for each quote in the right column.
Prompt 4: Choose 1 quote from the Ethnomath handout on Maya, write the quote out in the left column of a two column page, and write a brief commentary for each quote in the right column.
Prompt 5: Write your thesis statement for Essay #3.

Essay #3: History of Math: Comparison & Contrast Essay

Steps to complete:
✓ Working Thesis and 4-5 research questions
✓ Notecards for at least 3 sources
✓ Annotated Bibliography
✓ Complete phrase/sentence outline
✓ Complete draft for peer review
✓ Final version in manuscript form

Length: 4-5 pages, typed or word-processed, double-spaced

Purpose of the Assignment: To apply what we've been learning about the strategy of comparison and contrast analysis to one of the topics below. Your essay's general purpose will be to explain to your audience (your instructors and your classmates) an important outcome of your analysis of two subjects by comparison and contrast. I'll include more specific suggestions for purpose in some of the prompts below.

Assignment: Write a thesis-driven essay on one of the following topics. (A full, clear statement of what you have learned or gained from your comparison & contrast of one of the following pairs of subjects should serve well as your thesis for this assignment.)

Compare and contrast
• Newton and Leibniz, both considered to be the fathers of calculus (your purpose might be to explain the influence of culture on their separate processes of developing calculus)
• Piero dela Francesca vs. Albert Durer's use of math in their art
• Works of art (especially paintings) before the Renaissance with works of art from after the Renaissance in terms of their use of perspective
• Two different cultures mathematical systems and achievements (Mayan, Babylonian, European, Indian, Chinese,...)
• Two successful women mathematicians from different periods in history (explain the historical connection between gender and success in the discipline of math)
• Algebra vs. Geometry as gatekeeper for student access to higher education (explain how Algebra vs. Geometry came to be used as gateways: or, persuade your reader which you think should be used, if either.)
• The ancient "schools" (such as Ionian School, Eleatic School, Pythagorean School, Platonic School, School of Aristotle, School of Alexandria,...) vs. math "education" today (in universities)
• The number systems of two different civilizations
• Counting devices (quipus, abacus, calculator,...) (Explain how they evolved, how they worked, and what happened to them.)
• Numerals of two different times/civilizations (Example: Roman Numerals versus Hindu-Arabic Numerals)
• Two different methods of record keeping, time measurement, or calendars (from two different civilizations)
• Two different proofs for the Pythagorean Theorem
• Developments of Pascal’s Triangle from two different cultures or people
• Other ideas (You’re welcome to come up with your own pairs of subjects for this comparison and contrast essay, but you must get approval from Deann and/or Nancy.)

Organizing your ideas: Chapter 13 of the McWhorter text explains two generally accepted strategies for organizing and developing compare/contrast essays: "subject by subject" and "point by point." For long essays like this, I recommend that you follow the point-by-point pattern. It may take a little more effort to develop an outline for the point-by-point pattern, but in the end it is easier to write because transitions between topics are easier to handle. I will be distributing a worksheet to help you generate and organize ideas for this essay.

Required Elements:
• Clear thesis statement. Your thesis should be articulated as a claim that unifies all the points of contrast and comparison about the two math subjects you’ve chosen to research and analyze.
• Organized body paragraphs. Use topic sentences!
• Internal citations that follow MLA guidelines.
• A "Works Cited" list that follows MLA guidelines (at least 3 sources are required).
• Readable and grammatical sentences.
• Coherent presentation of ideas (smooth train of thought). Use transitions liberally but carefully!

Notes:
1. You probably will not be able to say everything there is to say about each of your subjects. Think about your audience, purpose and thesis as you make decisions about what to include in your essay.
2. The main topics you discuss for one subject should be discussed for the other. Although the same main topics should be discussed for each subject, it is not necessary to discuss these topics in equal detail.

3. Make sure your main observations or claims are fresh and interesting. That is, avoid obvious comparisons and contrasts. Your reader will be most interested in a paper that has new information or suggests new ways of seeing things.

4. Use rare or interesting concrete details to support your general observations and claims.

5. If you need help understanding mathematics you encounter, see Deann early in the process. She will help determine if the math is at an appropriate level to include in your paper.

Resources:

- Pro-quest, Ethnic News Watch and other academic databases can be accessed in EdCC library.
- Check out periodical indexes in EdCC library.
- Conduct your own interviews with instructors on our campus.
- Books that relate to the History of Math are on the shelves in the library and can be checked out.
- Your instructor has many books related to these subjects. You can check these out from her.
- Use other libraries in the area: Sno-Isle, King County, the Univ. of Washington, Everett Community College, Shoreline Community College, etc.
- Though many Internet sites are unreliable, a few good ones on this topic are
  - [http://www-groups.dcs.st-and.ac.uk/~history/](http://www-groups.dcs.st-and.ac.uk/~history/) (Gives good general history of math information and biographies of mathematicians.)
  - [http://www.rpi.edu/~eglash/isgem.dir/links.dir/classrm.htm](http://www.rpi.edu/~eglash/isgem.dir/links.dir/classrm.htm) (Ethnomathematics--non-European history of math-- links)
  - [http://nunic.nu.edu/~frosamon/history/math.html](http://nunic.nu.edu/~frosamon/history/math.html) (general history of math)
  - [http://aleph0.clarku.edu/~djoyce/mathhist/subjects.html](http://aleph0.clarku.edu/~djoyce/mathhist/subjects.html) (list by subject of math)
  - [http://archives.math.utk.edu/topics/history.html](http://archives.math.utk.edu/topics/history.html) (extensive list of history of math topics)
- Books that relate to History of Math are on reserve in the EdCC library.
  1. Yount, Lisa. *A to Z of Women in Science and Math*
  2. Smith, Sanderson M. *Agnesi to Zeno: Over 100 Vignettes from the History of Math*
  5. Bell, E.T. *Men of Mathematics*
  6. Linn, Charles F. *Mathematics East and West*
  7. Gullberg, Par. *Mathematics: From the Birth of Numbers*
References for Algebra the Write Way- Module 1:


