
The Use of Writing as Both a Learning and an Assessment Tool

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Background

- My experience with Lawrence's Freshman Studies course
 - The writing-across-the-curriculum research
 - Assignment creation
 - Revision and feedback
 - Multitude of writing possibilities
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Assignment Creation

- Clear definition and articulation of the assignment
 - RAFT criteria: Role, Audience, Format, Theme/Task/Topic (adapted from Bean, 2001)
 - Inclusion of a grading rubric
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Example Assignment (not well thought out)

Select a newspaper, magazine, or Internet article that involves statistics, as you currently know it (be sure to include the source). Type a short (2 – 3 paragraphs) yet complete explanation of how and why the statistics are used in the article. If you think the statistics are used well (e.g., illuminated a point), then explain why. Or if you think the statistics are misused, then explain why.

Revamped Example Assignment

Carefully read the newspaper article included below. Type a 1-page, single-spaced letter to the editor, responding to the article. In the letter, clearly explain if the study allows for the conclusion that a causal relationship exists between [insert variables from any article]. Because you are writing to all readers of the newspaper, do not assume that your audience has taken a statistics course (i.e., do not use technical terms).

Revision and Feedback

- Importance of revision
 - Student misunderstanding of the revision process (see, for example, Bean, 2001; Sommers, 1980)
 - The message your feedback sends to students (see, for example, MacAllistar, 1982; Bean, 2001)
 - Time-saving methods
 - Well-planned assignments are easier to grade
 - Smaller microthemes (Bean, 2001)
 - Ways of marking (e.g., Elbow, 1997; Haswell, 1983)
 - Peer review (e.g., Holt, 1992; Elbow and Belanoff, 2000; Bean, 2001)
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Multitude of Writing Possibilities

- Informal versus formal (e.g., Britton, 1975; Elbow, 1997)
 - Journals, definitions, explanations, meaningful paragraphs, etc. (for more examples, see Bean, 2001; King, 1982; Rose, 1989)
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Tales from the Frontline: Assignments I Used Last Term

- First day/Last day informal writing
 - Two formal writing assignments (in the form of letters home to dad)
 - One “meaningful paragraph”
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First Day/Last Day Informal Writing

On the first day and last day of class, students informally wrote for 5 minutes on the following question:
What is statistics and how is it relevant?

They turned in their writing, but did not include their names.

- Purpose of assignment
 - What did I learn?
 - Would I use it again?
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Formal Writing Assignments

Assignment #1

Suppose you receive the following letter from your dad:

Hey Kiddo,

I am worried about Grandma. Remember that she was diagnosed with high blood pressure? Well, she's currently taking the medication Makemewell to lower her blood pressure. At the time of Grandma's diagnosis, her doctor said that a randomized, double-blind experiment had been conducted and that Makemewell was shown more effective in lowering blood pressure than a placebo. To be honest, I have no idea what any of that means, but I believed and trusted the doctor. Now I've heard two stories that make me think differently. Larry, our next-door-neighbor, was taking Makemewell and he got a terrible fever that put him in the hospital. Also, my co-worker, Sally, actually had her blood pressure go up while she was taking Makemewell! I'm now very suspicious of this medication.

I know that you're taking a statistics course at college. Based on the information I've given you, do you think Grandma should stop taking her medication? Whatever your opinion, will you please explain yourself thoroughly and clearly? (I will draw on your responses when I talk with the doctor.) And please don't use any statistics mumbo-jumbo that I won't understand. I really appreciate your help with this.

Love, Dad

Your assignment is to type a 1-2 page letter (single-spaced, 12-pt. font) responding to your dad.

Assignment #1

Grading Criteria (30 points possible)

_____ The explanation to your dad convinces me (your teacher) that you understand the statistical concepts involved in the assignment. (14 points)

_____ The explanation to your dad is thorough, well organized, and clear. (6 points)

_____ The explanation to your dad is presented in non-technical terms that he will understand. (5 points)

_____ You successfully paid attention to accepted conventions of language use (syntax, spelling, grammar, readability, etc.) (5 points)

Assignment #1

Peer Review of Writing

(Adapted from *Engaging Ideas* by John Bean and *Sharing and Responding* by Peter Elbow and Pat Belanoff)

Recall the grading rubric for the assignment:

Grading Criteria (30 points possible)

_____ The explanation to your dad convinces me (your teacher) that you understand the statistical concepts involved in the assignment. (14 points)

_____ The explanation to your dad is thorough, well organized, and clear. (6 points)

_____ The explanation to your dad is presented in non-technical terms that he will understand. (5 points)

_____ You successfully paid attention to accepted conventions of language use (syntax, spelling, grammar, readability, etc.) (5 points)

Divide a sheet of paper (or the back of this handout) into three columns headed +, -, and ?. Carefully read the other student's paper (and keep in mind the grading criteria above). While reading,

- in the + column note aspects of the paper that work well;
- in the – column note problem areas and negative reactions, such as disagreement with ideas;
- in the ? column, note questions that occurred while reading, such as places that need clarification or more development;
- place a wavy line in the margin every place where you got confused as a reader;
- mark any obvious syntax/spelling/grammar mistakes (but don't spend a lot of time with this – you should focus on the bigger issues of organization, clarity, and development);
- mark any places where technical language is used.

Lastly, complete the following believing/doubting activity:

- Believe (or pretend to believe) everything the author has written. Be his/her ally and tell him/her what you see. Give him/her more ideas and perceptions to help his/her case. Then doubt everything and tell him/her what you see. What arguments can be made against what he/she said?"

Note that you may need to read the paper multiple times in order to give careful and complete feedback.

Now share your comments/suggestions/concerns with the author (and allow the author to keep your written comments).

Notes to the author:

Think carefully about the feedback you receive today. You certainly are not required to implement all the changes suggested, but you should consider them (and purposely decide whether or not to make them). Revision is a very important part of the writing process. Based on today's peer comments, as well as your own reconsideration of your paper, you should create another draft of the letter to your dad. I strongly suggest that you take your revised paper to the writing lab in the Center for Teaching and Learning (first floor of Briggs Hall) for further review. As always, please let me know if you have questions about the specifics of the assignment or writing in general.

Assignment #2

Suppose you receive another letter from your dad:

Hey Kiddo,

Thanks so much for your response to my last letter. I now understand what a randomized, double-blind experiment is, and I feel better about the money I'm spending on your college education. Grandma is still taking Makemewell, and we're monitoring her progress.

I got more information from the doctor about the Makemewell experiment. The doctor said that 40 high-blood-pressure patients took Makemewell and 40 patients took a placebo (and the patients were all around Grandma's age). The average reduction in systolic blood pressure was 19.5 millimeters of mercury (mm Hg) for the Makemewell group and 9.1 mm Hg for the placebo group. This much I can understand. Then the doctor mentioned significance testing (and hypotheses), and she said the difference in average blood pressures was statistically significant based on a p-value that was less than 0.001. Do you know what the doctor is talking about? What are all these terms, and how can they help me understand the effect of Makemewell? As before, please explain yourself thoroughly and clearly, and don't use any technical language.

I'm really glad you're taking a statistics class this term. Your knowledge has been very helpful.

Love, Dad

PS I'm enclosing a check to get you through the rest of the term.

Your assignment is to type a 1-page letter (single-spaced, 12-pt. font) responding to your dad.

Assignment #2

Grading Criteria (30 points possible)

_____ The explanation to your dad convinces me (your teacher) that you understand the statistical concepts involved in the assignment. (15 points)

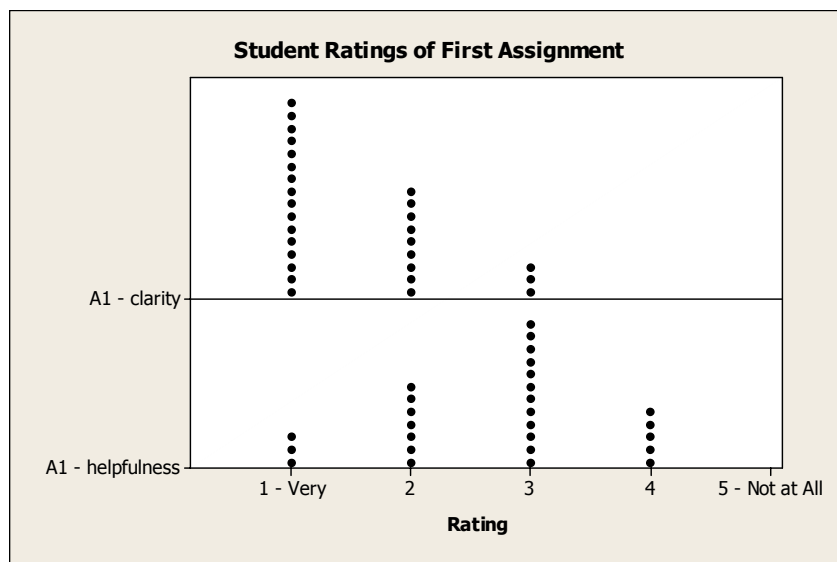
_____ The explanation to your dad is thorough, well organized, and clear. (6 points)

_____ The explanation to your dad is presented in non-technical terms that he will understand. (4 points)

_____ You successfully paid attention to accepted conventions of language use (syntax, spelling, grammar, readability, etc.) (5 points)

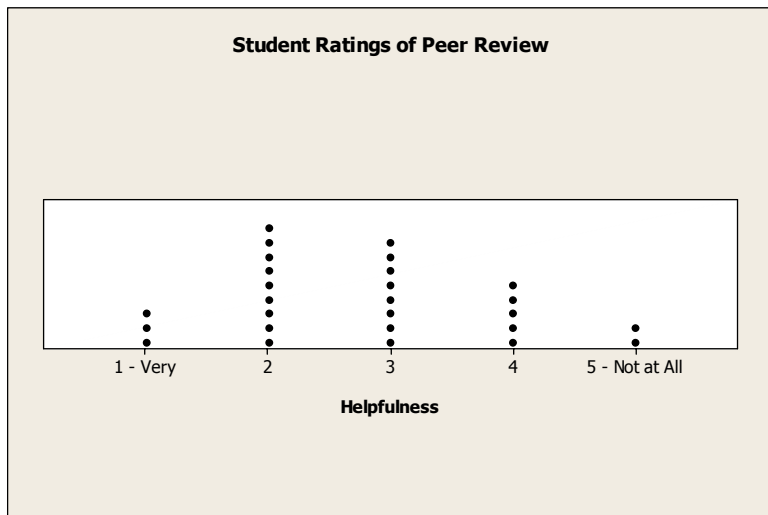
Formal Writing Assignments

- Purpose of assignments
 - What did I learn?
 - Clarifications to assignments
 - Peer review process
 - Student feedback
 - Student understanding
 - Grading time
 - Would I use them again?
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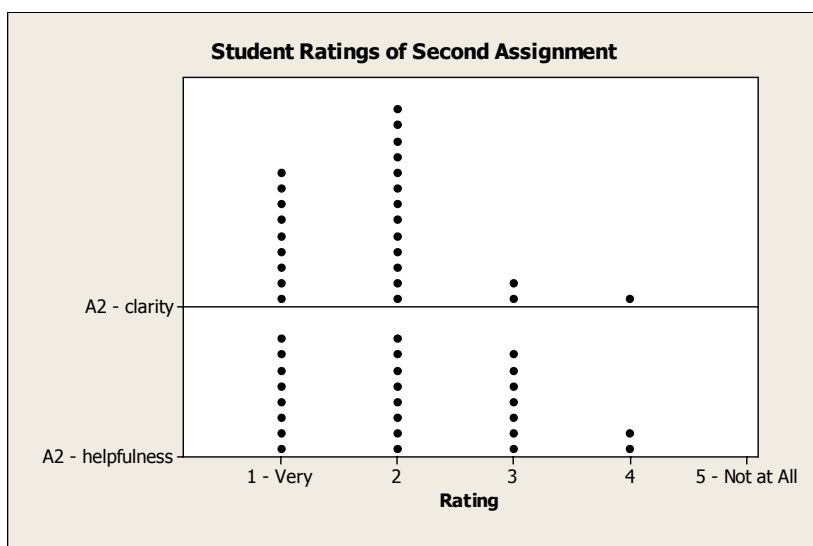
Assignment 1 – Improvement Suggestions (from students)

- “Make it more open, but still include concepts from class.”
- “Add more statistical analysis.”
- “Make it on a concept that’s harder to understand, so we’ll have to think through it more.”
- “It helps you know what we know what we’re talking about, but it didn’t really help me, but I wasn’t really that confused.”
- “Perhaps a letter to dad about a real article.”
- “It could have involved more difficult concepts.”



Peer Review – Improvement Suggestions (from students)

- “Have more than one peer review the paper.” (2 comments)
- “Have more time to discuss with each other.”
- “Not really necessary.”
- “Peer review is usually not helpful. It’s hard to take feedback from students – they generally don’t know much more about the assignment or content than you.”
- “Helpfulness depended on partner.”
- “The problem was that no one knew any more about the assignment than the next person, like what you (prof.) wanted/expected.”
- “It’s hard to make people who don’t care want to help others.”



Assignment 2 – Likes and Dislikes (from students)

- “It made me look up things I thought I understood so that I could explain them more fully. There were things I didn’t know that I had thought I knew.”
 - “It wasn’t that helpful because it is extremely difficult to explain a p-value to someone without lots of statistical background. I didn’t feel it was successful.”
 - “I definitely understand the terminology better, but our tests don’t really ask terminology questions.”
 - “Practicing writing about significance tests helped me to further grasp the concept and the meaning of terms.”
 - “Although I was originally confused about *what* I was supposed to include, by having to figure out *how* to write it, I made a lot of connections in my own head.”
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Meaningful Paragraph

Elaine Backus, an entomology professor at the University of Missouri, created a writing assignment called a “meaningful paragraph.” She defines a “meaningful paragraph” as one continuous piece of writing that uses all of the words from a given subset and in which the sentences make sense and hang together.

Meaningful Paragraph Assignment

Write a meaningful paragraph that includes the following terms: sampling distribution, population mean, sample mean, variability, normal distribution, sample size, and probability.

A “meaningful paragraph” is one continuous piece of writing, which uses all of the listed words and in which the sentences “make sense and hang together.” That is, the ideas in the paragraph have to illustrate that you have understood the new terms in a way that allows you to write “meaningfully” about them. You may not simply write seven sequential sentences, for example, that merely define the terms; sentences must demonstrate relationships between the terms.

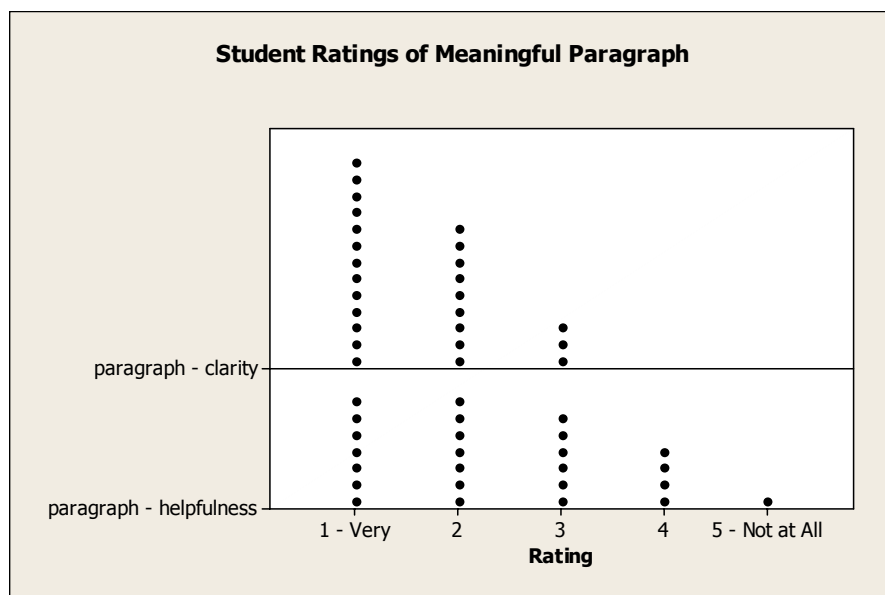
Example Meaningful Paragraph

(For the terms correlation, causation, regression line, prediction, variation, residual, and outlier)

The researchers considered the relationship between diastolic blood pressure and average daily calorie intake for their sample of 100 patients. There was a fairly strong, positive *correlation* between the variables. A *regression line* was fit, so blood pressure *predictions* could be made from daily calorie intake. The researchers cautioned that the predictions may not be very accurate, though, as there was a lot of *variation* in the blood pressures that was unexplained by the regression line. Furthermore, they noted that the data set contained two *outliers* with large *residuals*. These were individuals with high calorie intake, but surprisingly low blood pressures. The findings provide some evidence of a link between calories and blood pressure, but do not necessarily show *causation*. The researchers clearly stated that other confounding variables were not carefully controlled for in their study.

Meaningful Paragraph

- Purpose of assignment
 - What did I learn?
 - Student feedback
 - Student understanding
 - Grading time
 - Would I use it again?
-



Meaningful Paragraph – Likes and Dislikes (from students)

- “You have to really know a concept to write a paragraph on it.”
- “I liked the assignment – allowed you to be creative while still using terms that we learned in class.”
- “Helped me realize I didn’t understand it as well as I thought I did.”
- “Had to use terms in context, which was good.”
- “It was well defined, but I felt that it got away from what we were learning about. We could choose anything to write about pretty much.”
- “I preferred the letters. This just seemed like a waste of time since I understood the concepts we were using although I could see how it would be helpful.”

- “I had a little bit of trouble getting my thoughts around sampling distributions. Perhaps if we could go through vocabulary a bit more, specifically terms that are very subtle in their differences.”
 - “Using the terms in a context without actually defining them was good practice to aid in understanding the terms... not just regurgitating some definition.”
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Future Plans

- Create and assign many meaningful paragraph assignments throughout the term
 - Revise assignments each term, based on previous experience
 - Include revision?
- Carefully assess how and how well the meaningful paragraph assignments aid student understanding

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