

Engineering Writing Apprehension, Engineering Writing Affinity

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do engineers dislike writing?*

* Engineering students, educators, professionals ,
and the general public often assume that the answer
is “yes”.

This is supported by our unpublished results, but more generally, it is mentioned in passing in writing both for and about engineers. For some specific examples, note the ethnographic work of Dorothy Winsor; or the introductions to many engineering writing books or tutorials, like *A Guide To Writing Like An Engineer 4th Edition* (2013) by David Beer, or simply search for “engineers dislike writing” to see how generally it is mentioned in passing whenever engineering communication is discussed. While you’re at it, search for “jokes about engineers” and note how many focus on poor communication skills, like: “How do you tell an extroverted engineer? He looks at your shoes when they talk to you.”

The set of skills required for engineering
has changed drastically since the 1970s.
Our entering students are different, too.

UC Davis ranks no. 1 college for women in STEM ^[1]

^[1] FORTUNE MAGAZINE - CAMPUS/TECHNOLOGY - APRIL 13, 2016

University of California, Davis, came in at #1 on our list of best value colleges for women in STEM, with 56% female enrollment and 29% of the student body specializing in STEM. ^[2]

UC Davis Admits Nearly 41,300, Makes Gains in Diversity ^[3]

^[3] By Julie Ann Easley on July 5, 2017 in University News

With overall gains among historically underrepresented groups, those identifying themselves as African American, American Indian and Chicano/Latino now represent more than 30 percent of admitted California students at UC Davis. ^[3]



- ^[1] Leong, Y. “UC Davis Ranks No. 1 College for Women in STEM”. *The Aggie*, April 13, 2016.
^[2] Sportelli, N. “The 13 Most Important STEM Colleges for Women”. *Forbes.com*, March 29, 2016.
^[3] Easley, J.A. “UC Davis Admits Nearly 41,300, Makes Gains in Diversity”. *University News*, July 5, 2017.

What is our evidence?

Some of the most compelling *quantitative data* regarding engineering students’ aversion to writing comes from the 1970’s, when Daly and Miller first explored writing apprehension as a factor in students’ academic decisions and interactions.



Daly, J and Miller, M. “The empirical development of an instrument to measure writing apprehension.” *Research in the Teaching of English* 9(1975):242-249.

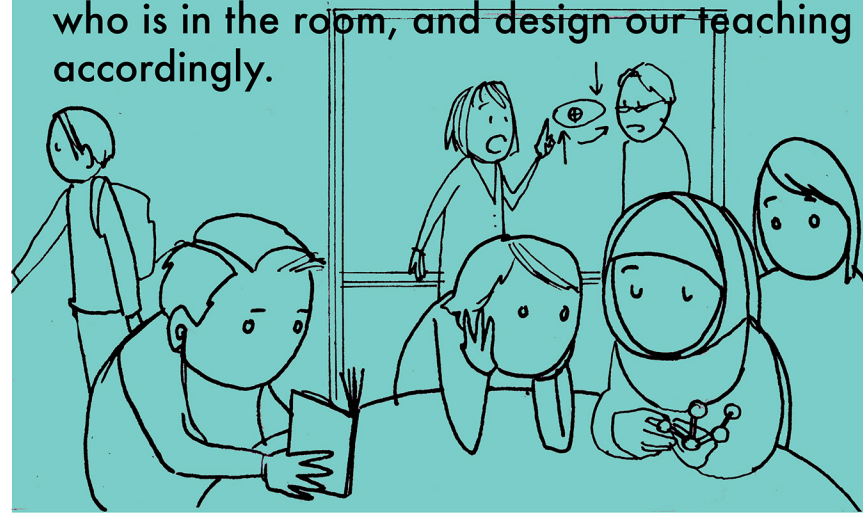
“The term **writing apprehension** was coined... to describe an individual difference characterized by a general avoidance of writing and situations perceived by the individual to potentially require some amount of writing accompanied by the potential for evaluation of that writing. The individual who is highly apprehensive finds the experience of writing more punishing than rewarding, and as a consequence avoids it.”

—J. Daly

(In other words, writing apprehension is an affective trait that affects writing motivation.)

Daly, J. “Writing apprehension in the classroom: teacher role expectancies of the apprehensive writer.” *Research in the Teaching of English* 13(1979):37-44.

We can no longer take a monolithic view of our students. Instead, we should use investigative methods to better understand who is in the room, and design our teaching accordingly.



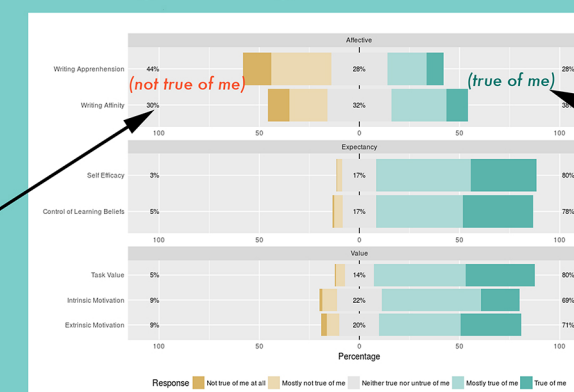
Studies have shown underrepresented students’ retention and achievement are improved when their experiences are reflected in curricula and educators attempt to build community amongst students. See, e.g., Tatum, B. D. (2000). “The ABC Approach To Creating Climates of Engagement on Diverse Campuses. *Liberal Education*, 86(4), 22–29 and Knight, D., et al (2013, June), “The Impact of Inclusive Excellence Programs on the Development of Engineering Identity among First-Year Underrepresented Students”, Paper presented at 2013 ASEE Annual Conference & Exposition, Atlanta, Georgia.

So are today’s engineering students apprehensive of writing?

YES, THEY ARE:

In a survey of learning motivations of students toward their engineering writing classes, students reported far more writing apprehension than any other kind of demotivational trait.

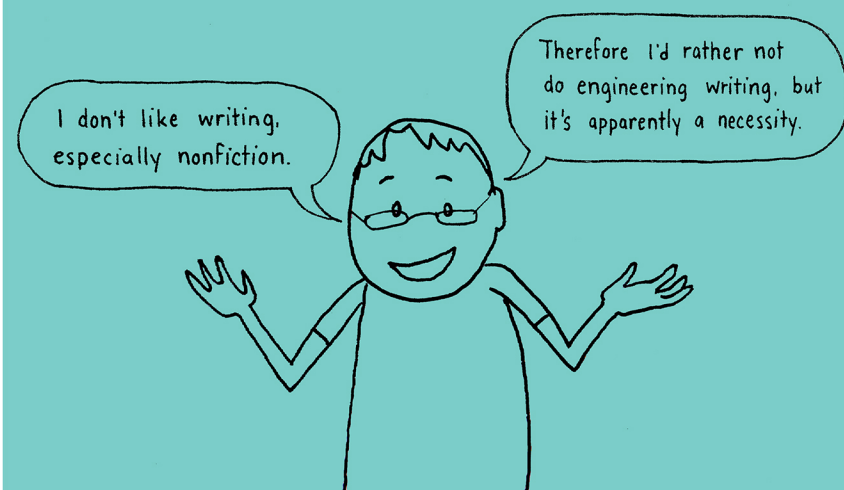
Student Average Response for Writing Learning Motivation Scales



..and NO, THEY ARE NOT:

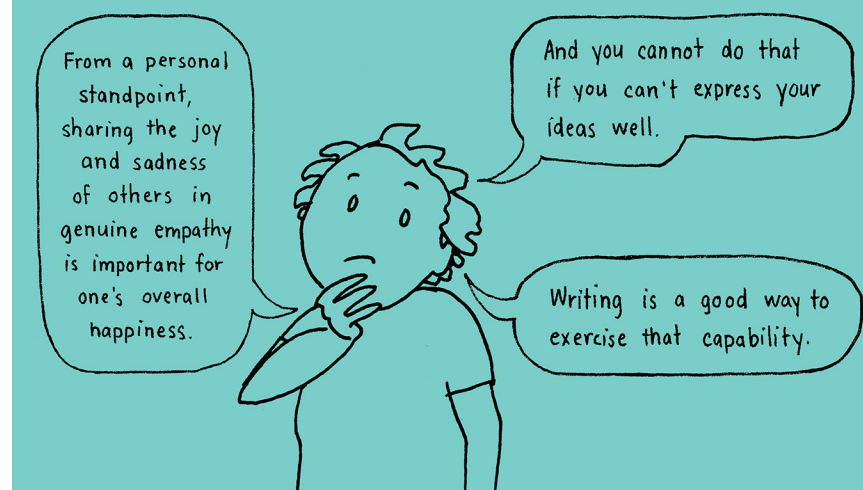
Writing apprehension was also the most divisive motivational trait. A comparable group of students professed writing affinity, or a confidence and enjoyment for writing activities.

It’s true: for every student who answered our survey this way...



Comments paraphrased from student survey.

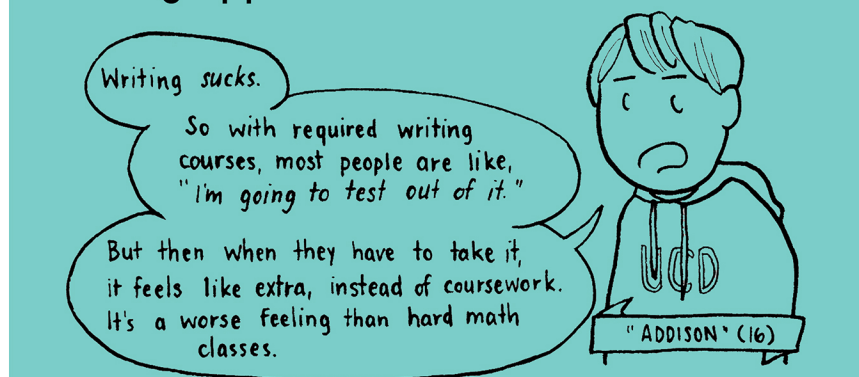
... there was another who answered quite differently.



Comments paraphrased from student survey.

So engineering students have a range of affects toward writing.

At UC Davis, some can test out of writing courses. How does this influence their writing apprehension?



Comments paraphrased from student interview #16, “Addison”, a student who self-reported writing apprehension traits.

Our research reminds us that **writing apprehension is not destiny**. It is simply one of many student traits to consider while designing a successful and inclusive class.



Comments paraphrased from student interview #16, “Addison”, a student who self-reported writing apprehension traits.

How should we design communication learning opportunities for our students, and their breadth of apprehensions/affinities?

1. We can facilitate classes in which making mistakes is part of learning (and writing).

We can acknowledge that writing apprehension exists, and that sharing writing involves taking risks.[1]

We can include low-stakes writing activities, and assignments that allow students multiple attempts. [2]

We can communicate high expectations, and also our confidence that students can meet them. In a recent study, even a simple note to this effect resulted in students achieving more improvements.[3]

2. We can adopt inclusive teaching practices.

We can honor students’ lived experiences with writing and communication as valid, and as a springboard for engineering communication. [4]

We can emphasize the social and ethical dimensions of engineering, as this has been shown to help retain women and students of color. [5]

We can include diverse examples of both successful and unsuccessful writing, so that students are more likely to see their own experiences reflected in the course. [6]

3. We can give clear feedback and encouragement.

When we asked UC Davis students what they’d do to motivate and support students like themselves, many students mentioned focused and timely feedback, as well as positive words about their potential and progress.

Research shows that effective feedback concerns only the most important aspects of the assignment (up to three), in an assignment structure that allows students the time and opportunity to implement it. [7]

Our upcoming work includes:

* Students’ perception of the credibility of writing instructors’ statements, as a function of the intersectional identity of students and instructors.

* The role of emotions, such as pride and shame, in student experiences and approach to writing classes.

* Motivational factors in writing education.

Partner with us!

Our ongoing work requires partnerships with writing, engineering, and STEM instructors.

[1] Ingleton, C. (2000). Emotion in learning: a neglected dynamic. *Cornerstones of Higher Education* 2000; 22:86-99
[2] Bean, J. Engaging Ideas: The Professor’s Guide to Integrating Writing, Critical Thinking and Active Learning in the Classroom. San Francisco: Jossey-Bass, 1996.

[3] Yeager, D. S., et al. (2014). Breaking the cycle of mistrust: wise interventions to provide critical feedback across the racial divide. *Journal of Experimental Psychology: General*, 143(2), 804–824.

[4] Delpit, L. (1988). The silenced dialogue: Power and pedagogy in educating other people’s children. *Harvard Educational Review*, 58(3), 280–299.

[5] Tatum, B. D. (2000). The ABC Approach To Creating Climates of Engagement on Diverse Campuses. *Liberal Education*, 86(4), 22–29.

[6] Baker, D., et al. (2007). “An Intervention to Address Gender Issues in a Course on Design, Engineering, and Technology for Science Educators.” *Journal of Engineering Education* 96(3): 213-226

[7] Ambrose, S. A., Bridges, M. W., DiPietro, M., Lovett, M. C., Norman, M. K., & Mayer, R. E. (2010). How learning works: Seven research-based principles for smart teaching. San Francisco, CA: Jossey-Bass.