

# PUTTING THE PSYCH IN PSYCHOMETRICS

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Imagine that you have just spent an hour explaining the operation of the Newton-Raphson iteration technique to your second-year doctoral students. You are standing in front of the class and feeling quite pleased with yourself. The board and screen are covered with equations and graphs. One palm is damp from continuous use of the laser pointer, the other is chalk-covered. You are slightly out of breath, yet strangely energized.

You have lectured on this topic a half dozen times in your career. Tonight, however, you feel you have actually "taught" the students how the technique works and why knowing about it is important. You even believe you have made the topic interesting, if not exactly exciting. Bottom-line, you have answered the ultimate questions, "So what?" and "Who cares?"

As you look at the students, awaiting their applause, a thought occurs, "What are they thinking?" You ponder this question as they file out of the room. There is no applause, no wave, no cheers, not even a "Nice job, Doc!" You wonder how they describe this class to their friends. What visual images do they construct for their audiences?

Over the next couple of days you ask a few students what they thought about the lecture. Did they understand it reasonably well? Was it clear? Did it make sense? Was it at their level? Where were the tough parts? Where did they begin to lose it? Their responses are non-descript—it was fine, it was interesting to see how the parts fit together, it made sense at the time, it was challenging but OK. Their responses, while somewhat supportive of your efforts, don't leave you satisfied. So you decide to try something unusual in the next class.

At the start of the next class session you ask them to

"draw a typical classroom experience that includes me, yourself, and everything else that represents that classroom experience." The class ripples with giggles. Students look at one another. Puzzled expressions are exchanged. Whispers and groans are heard. Some of them look at you as if you have gone really weird on them this time. Eventually they begin to draw.

When everyone has finished, you ask them to turn the paper over and write an explanation of the scene. In addition, you ask them to write what they think the drawings convey about the course that is not conveyed in the scannable course evaluation forms.

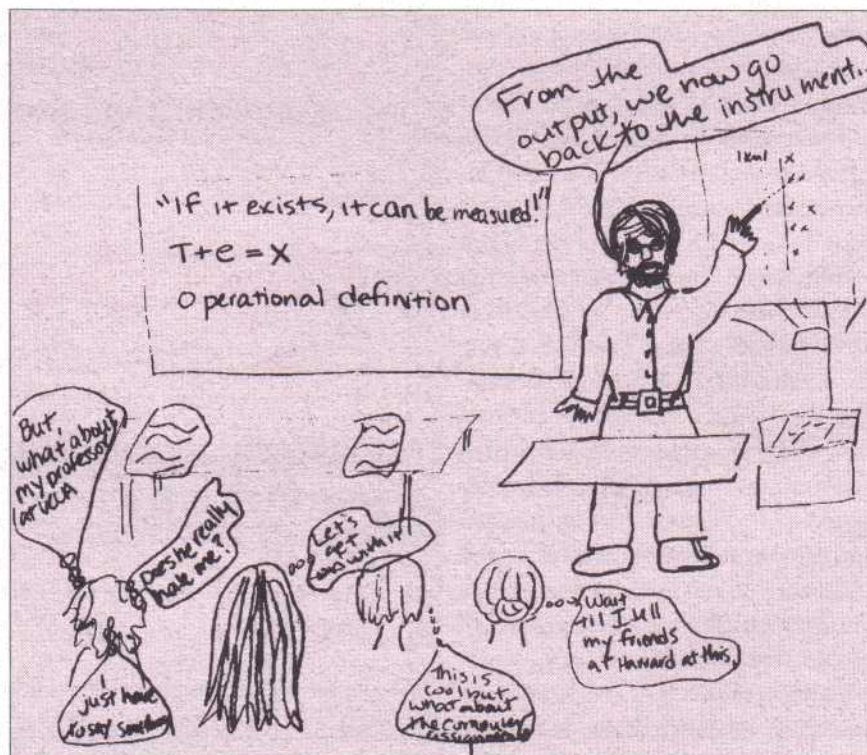


Figure 1: Doctoral student drawing of an intelligible presentation

Figures 1 and 2 were drawn by two students at the start of one of the final sessions of my spring 1998 psychometrics class. From my perspective, Figure 1 reflects a relatively positive classroom experience. The "statement bubble" over my head makes sense, there is a discernible variable map on the overhead, there are correctly stated phrases on the blackboard, and the students are all engaged and awake at some level.

Figure 2, however, is disturbing. Although I see an interpretable diagram of category characteristic curves, there is absolutely no doubt that this is a scene conveying an environment of confusion.

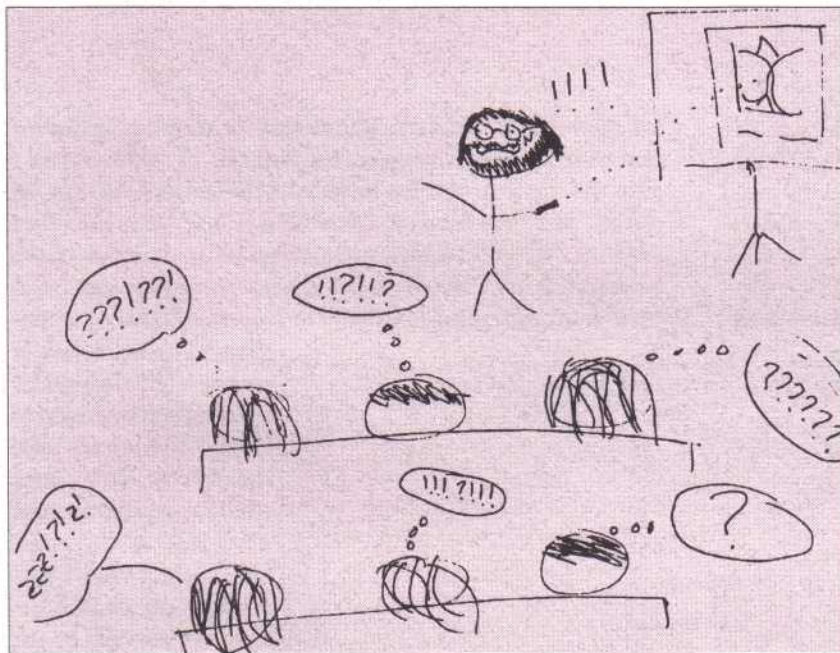


Figure 2: Doctoral student drawing of an unintelligible presentation

Since 1983 I have taught graduate level statistics and psychometrics courses. At the close of each semester I pass out the standard course evaluation forms required at my university. Over time, however, it has become apparent that the evaluations give me little information about student experiences in my classes. The forms are also very poor indicators of teacher effectiveness (Ludlow, 1996). When I learned in 1995 that elementary and middle school students were drawing interesting pictures of their classrooms that were useful to teachers (Haney, et al., 1998; Gulek, in progress), I decided to try the drawing technique in my classes. I now have drawing data from seven different graduate courses that I teach in measurement, evaluation, and statistical analysis—Interpreting & Evaluating Research, Statistics I, Statistics II, Multivariate I, Multivariate II, Psychometrics, and Seminar in Educational Research.

To my amazement and delight, the drawings are rich

beyond any expectation I held for them. In fact, the gestalt portrayed in these drawings is so powerful that I am still unable to adequately explain the analytic process by which I try to understand their meaning. The problem, of course, is how to interpret and explain these drawings in some way that is not self-serving, idiosyncratic, or arbitrary.

To that end I am pursuing a variety of research questions. Basically, I am curious about how a viewer interprets and describes the information in drawings generated for course evaluation purposes. To a certain extent I am asking, "How do I get past the bean counting of feature detection analysis in order to expose unconscious expression and impression?" More

practically, I am exploring: (a) what is important in these drawings? (b) what are students trying to say about a particular course and instructor? (c) what is unique and different about the courses? (d) which patterns are similar across courses? and (e) how can these drawings be systematically analyzed? Finally, how can qualitative drawing data be combined with quantitative course evaluation data to yield a richer understanding of the psychological dynamics underlying student evaluations of a course?

These questions are addressed in a number of articles in progress (titles subject to change). These include articles on self-inquiry and reflection on teaching practice, statistics education, alternative modes of evaluation of teaching in higher education, and the analysis of qualitative data by a non-qualitative researcher.

Sound interesting? If so, and if you think you have a relatively thick skin, then ask your students to draw you and themselves near the end of one of your next classes.

#### References

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- Haney, W., Russell, M., Gulek, C. & Fierros, E. (Jan/Feb. 1998). Drawings on education: Using student drawings to promote middle school improvement. *Schools in the Middle: Theory into Practice*, 38-43.
- Ludlow, L.H. (1996). Instructor evaluation ratings: A longitudinal analysis. *Journal of Personnel Evaluation in Education*, 10, 83-92.

Ludlow: Psychometrics drawings: 5/7/98