Reviewer's report

Title: Innovations in curriculum design: a multi-disciplinary approach to teaching statistics to undergraduate medical students

Version: 1 Date: 29 January 2008

Reviewer: Paul Marantz

Reviewer's report:

This is a well-conceived, well-written paper that addresses an important topic. How nice to see a reasonable, feasible intervention that leads to an improvement in students' understanding of some basic, fundamental statistical concepts! I have only a few suggestions.

MINOR ESSENTIAL REVISIONS:

1. In the "Background" section, it would be reasonable to provide some references for the statements that "students across all disciplines" commonly "dislike and under-perform in courses involving mathematics, numeracy or statistics." (If medical residents are included as "students," a recent example of such a reference would be: Medicine Residents' Understanding of the Biostatistics and Results in the Medical Literature; Donna M. Windish, MD, MPH; Stephen J. Huot, MD, PhD; Michael L. Green, MD, MSc; JAMA. 2007;298:1010-1022.)

2. Likewise in the "Background" section, I think the italicized comments from the students indicate their dislike of the course, but not that it "does not entirely meet their needs." More appropriate quotes, or relevant data, should be presented.

3. Whether in the "background" or "methods" section, some description of the educational setting would be of great value to the reader. We know the class size is large, at 260, but that's about it. Anything of interest about the particular school and its curriculum -- location, demographics, number of hours devoted to statistics in the curriculum, where (i.e., what year) this is taught -- would be helpful.

3. In "methods" -- the bulleted list of "outcomes" of the project don't seem to be outcomes. Would reword as "aims" or "goals."

4. There are some locutions and spellings that are uniquely British (or at least, not American English), and I think I figured out most of them, but perhaps such phrases as "statistics at 'A' level" and "a general practitioner's surgery" could be replaced by more generic phraseology, or defined for the rest of us.

5. Please provide some examples of the scenarios used -- it isn't entirely obvious (at least to me) how a GP uses statistics in her/his practice (at least, not involving P values and confidence intervals). Perhaps a text description of one or two
scenarios would help -- and maybe even a web link to some of the video clips and animations.

6. MOST IMPORTANT [METHODOLOGIC] COMMENT: the data showing an improvement in students' understanding of the basic concepts is striking, almost too good to be true. For instance, almost NO students provided a textbook answer on CIs the "old style" year, and 20% did the "new style" year. It's great that the assessors were blinded to the student's cohort when grading the answers, and that helps a lot. But my concern is: was the teaching "style" the only difference between the two years? One possibility is that the "textbook" answers were somehow provided to the students more clearly during the "new style teaching" year (e.g., providing new and more precise language regarding the difference in CIs in the class notes). Or perhaps the "set-up" for this student assignment was different in the two years (e.g., "old style" they were asked to fill this out at the last class, and "new style" they did it right after they had studied for the exam). I think it's critical that the authors provide more information related to comparability between the 2 assessments.

DISCRETIONARY REVISIONS:

1. Since you had 8 students to a tutor, you needed 32+ faculty to teach this. Can you describe anything about their backgrounds and statistical expertise, and how you recruited or incentivized them to do this teaching?

2. Small point, but since you referenced my paper: you mentioned that in the Marantz study "the amount of teaching time was greater." I'm not sure if this is true, assuming you had 5 lectures followed by 5 tutorials. Even if the tutorials were 1 hour each, that's 10 hours for statistics -- our course has a total of 18 hours for statistics, epidemiology, and clinical research design, so significantly less than 10 hours for statistics. As I said, small point...

3. There are a few minor spelling, punctuation, and grammatical errors that should be corrected.

GENERAL COMMENTS:

Overall, a nice piece of work, adding important evidence that focusing on the learners' needs (as consumers rather than producers of statistical analyses) and providing the appropriate context helps medical students learn the statistics they need to understand.

What next?: Accept after minor essential revisions

Level of interest: An article of importance in its field

Quality of written English: Needs some language corrections before being published

Statistical review: No, the manuscript does not need to be seen by a
statistician.

Declaration of competing interests:
I declare that I have no competing interests.