

Introducing Confounder-Based Statistical Literacy

Statistical Educators,

You may be looking for (or open to) ideas on introducing statistical literacy. You may be focused presenting key statistical concepts and ideas, statistical reasoning and thinking to students in non-quantitative majors (English, art) or to those in non-STEM quantitative majors (Sociology, Business),

Consider confounder-based Statistical Literacy: critical thinking about everyday statistics. The social goal of this course is to make citizens more discerning consumers of numerical information, empowering them to "See the Story Behind the Statistics". The educational goal is to help students read, interpret and evaluate everyday statistics. It has been taught to over 3,000 students by over a dozen faculty. Students like this course. In an anonymous survey (100+ students), about half agree or strongly agree that it should be required by all students for graduation. Most of the rest are neutral.

Based on a grant from the W. M. Keck Foundation, this confounder-based statistical literacy course was designed for students as a general education course. Most of these students are more interested in statistics from observational studies or quasi experiments than from randomized trials; more interested in observational causation and the strength of statistical evidence than in statistical inference. .

This course is different: less than a 30% overlap with any traditional Intro textbook. No computer software and no algebra. Students work multivariate problems -- as recommended by the GAISE 2016 guidelines. These problems take into account (control for) the influence of a measured confounder on a two-group comparison. They do this without using computers or algebra by using weighted averages. Doing this helps them understand how statistical comparisons can change in size and direction (Simpson's paradox) after taking something into account quantitatively. They see how a statistically-significant association can become statistically-insignificant (and vice versa) after taking something into account.

This course uses ordinary English to describe and compare conditional probabilities using rate and percentage grammar presented in statements, tables and graphs. This is helpful for ESL students. Strong focus on recognizing and avoiding the confusion of the inverse. Students learn about the Cornfield conditions: the necessary conditions for a measured confounder to nullify or reverse an association.

This course has a slides, problems, exercises, tests and a textbook published by Kendall Hunt.

<https://he.kendallhunt.com/product/statistical-literacy-2023-critical-thinking-about-everyday-statistics>

This course is a catalog course (Math 1300) at the U. of New Mexico (UNM ABQ) where it satisfies a math requirement in their General Education. It has been taught for 4 years (200 students per year) by 5 faculty and is now required for ALL statistics majors. This course is offered at New College of Florida (NCF) where it is now required for ALL incoming students (240/year) taught in half-a-semester.

At UNM, this course has the same status as traditional introductory statistical inference as a pre-requisite for advanced courses. Whereas at NCF, it is considered a bridging course for the traditional course.

Check out confounder-based statistical literacy: a new subject for the 21st century.

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Statistical literacy publications at ResearchGate/Schield and at www.StatLit.org/Schield-Pubs.htm