

How to Teach a Calculus Based Elementary Statistics Course to Students Without a Calculus Background

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A central concept of statistics is the density function used to model the distribution of measurement variables. Understanding these statistical models and using the models is very difficult for students, and, as a result, students most often leave the statistics course feeling that they do not understand the subject. Gaining an understanding of density functions makes it possible for the student to create a visual description of the distribution of a measurement variable, to use the models to answer questions about a particular distribution, to understand the definitions of the main concepts and the descriptions of the primary theorems of statistics at a level that gives one confidence in one's ability to comprehend the subject, and to be able to do and understand statistical analysis.

Derive makes it possible for the student:

To gain the necessary experience with the algebraic description of the most important families of functions that are used as statistical model so that they are not intimidated by the description

To understand the relationship between the algebraic description and the shape of the graphs of families of functions;

To learn how changing the parameters in a particular family changes the shape of the graph;

To understand the area under a graph and how it relates to probability, to understand the integral concept, and the integral notation, and to be able to use the integral concept to answer probability question;

To understand the formulation of definitions which are more meaningfully and more usefully described using integral notation; and

To understand the formulation of the theory in terms of areas and integrals.

This workshop will demonstrate and use courseware for elementary statistics that was designed to take advantage of the power of Derive. This courseware was developed and tested last year, with very satisfactory results. However, the courseware is still in the developmental stage, so suggestions for improvements are very welcome. During the workshop we will work through the courseware to see how Derive is used and how it enhances the course, emphasizing the distinction

between this courseware and the standard textbook approach. The courseware also capitalizes on the power of a spreadsheet in a way that compliments the power of Derive. Derive helps the students understand these statistical models and how to use them- the spreadsheet helps the student make the connections between data, statistics and the models. The courseware focuses on helping the student construct an understanding of how to do statistical analysis and an understanding of this analysis by developing and understanding the relationship among the population, the sample and the associated model and theory. In the workshop we will work through how an understanding of these connections are constructed by the students.

