TEACHING STATISTICS FROM THE IDEA OF RANDOM VARIATION

Maria Izalina Ferreira Alves, Idemauro Antonio R. de Lara, and Maria Imaculada de Lima Montebelo
Methodist University of Piracicaba, Brazil
milmonte@unimep.br

THE PROBLEM

The terms “error”, “residual”, and “deviation of the model,” amongst others, may suggest to students attending a statistics lesson the idea that the statistician, when analyzing data, always looks for what is wrong, thus causing feelings of concern. Why does everything have to have an error? What does the \( p \) value mean? What is the probability of being correct or being wrong regarding the stated hypothesis? These questions are almost never answered in a practical way that is understandable for a researcher, because they are taught to use these disconcerting terms when they learn statistics.

METHODOLOGY

Our proposal is to start Statistics teaching by speaking from the idea of “random variation”. There are no errors, but only variations that really happen by chance, and from which other hypotheses, beyond the starting hypothesis can appear. Thus, the first definition of \( p \) value is the probability that (from a determined, and fitted probability distribution) the results are due to natural causes, and not to the variation and restrictive causes imposed in the experimental design at the time of planning. This would lead the researcher not to consider it an error when the statistics derived from his/her hypotheses lack significance, but that there are other causes of variation that happened by chance, there might be another factor to be studied or, if a variation appears on time, to describe results in this way will not diminish the relevance of the research.

RESULTS AND CONCLUSION

The methodology was tested in the phase of development of the conclusions with a group of students which were finishing the Nutrition course at UNIMEP (Methodist University of Piracicaba). The students concluded that some sources of variation could be added as “random variation” in the planning of the research. We intend to use the methodology in the discipline of Experimental Design in a Course of Applied Statistics (\textit{lato sensu}), to be held in 2006 in the UNIMEP.