EXPERIMENTAL STUDY ON THE LEARNING OF THE SIGNIFICANCE LEVEL CONCEPT

Angustias Vallecillos,University of Granada, Spain

The test of statistical hypotheses has constituted a fundamental tool work in the experimental research in the most various fields for a long time. They have also been object of abuse, either by improper applications or by wrong interpretations of its results. As a rule, the multiple problems derived from the improper use from these statistic procedures outline the need of improving the teaching of the same as a mean of improving also its applications. One of the key concepts in the tests of hypotheses is that of significance level that has been object of some research references that identify it as one of the main sources of mistakes in the applications of the tests of hypotheses. However, until the moment, there is not empirical evidence about the learning problems that this concept could represent for the undergraduates that are, many of them probably, those which will use thereafter these techniques in their research in an early future. In order to analyze in a way global and systematic the learning of the tests of statistical hypotheses of the undergraduates, we have carried out a theoretical and experimental research on a wide students sample of the Granada University of seven different major that have collaborated disinterestedly in the research. They have participated 436 students of Civil Engineering, Computer Science, Pedagogy, Business Studies, Medicine, Mathematics and Psychology that have answered a written questionnaire of 20 questions on conceptual and procedural aspects of the hypothesis testing and a problem of application of a test in a quality control context. The analysis of the answers of different type, of election of an option among four, of true/false and of short trial, as well as the resolution of the problem, has permitted us to have an assorted and quite complete information about the understanding of the students above all the key aspects of the topic. In this work we present some results that are referred to learning of the significance level concept. We have found a great variety of wrong interpretations of the concept that put very clearly of manifesto the learning difficulty of the same for a great number of students. The expressed mistakes affect to a great number of basic concepts in statistics and probability, conditional probability, sampling, etc., and this result has, in our opinion, a great didactic interest, since it puts of manifesto the need of introducing the teaching of these concepts in previous teaching levels since they have to be correctly understood and assimilated previously in order to be

handled after in a correct way in a much more abstract context. We have identified the main conceptions of the students on the significance level and provided elements that put on relationship some misinterpretations of this concept with the global logic of the process.

ACKNOWLEDGEMENT:

This paper form part of the Research Project PB96-1411 sponsored by the M.E.C., Madrid, Spain.