ABSTRACT

The study described in this chapter relates to learning hypothesis testing among students from engineering degree using technology and work project method. This project involved 31 students from the Informatics Engineering Degree responding to a small self-assessment survey applied in the four phases of project implementation. Beyond this, the authors collected data about the project reports and from a questionnaire related with students’ perceptions about of the developed project. These last two types of data were obtained after the completion of the project work. Analysis highlighted that the most of students appreciated a lot the methodology adopted in the learning of hypothesis tests. However, some students reveal that they experienced some difficulties in the use of R software and in some dimensions of statistical reasoning, especially in the case of knowledge of statistics in project context.

INTRODUCTION

Nowadays, it’s widely recognized the need for scientific training in the area of statistics, particularly in statistical inference, (Gonçalves, Afonso, Ferreira, Ferro & Nascimento, 2012) for students attending Engineering courses. The ability to collect data correctly, process and analyse this data, interpret the
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results of the analysis and generate knowledge are situations that, with great probability, may occur in the future professional and / or social activity of these students.

In this way, this visibility implies the development of a teaching that promotes the understanding of purpose, logic and statistical process, the mastery of procedural skills, the understanding of mathematical relationships, probability and chance and the development of interpretive skills, statistical literacy, the ability to communicate statistically, and useful statistical arrangements (Gal & Garfield, 1997).

Such knowledge and skills, which emphasize “knowing” and “doing” Statistics, and skills of communication as well as reflection and questioning, should be developed in teaching. The development of statistical projects is an especially suitable activity for acquiring such knowledge and skills. The valuing of the various stages of the statistical method, including the reports production and results presentation help in problem understanding.

In the case of Statistics, for Batanero (2013), statistical projects, of an investigative nature, implemented in a critical and autonomous environment, are an excellent way to effectively develop such knowledge and skills.

In this chapter, it is described, discussed and evaluated the application of a teaching method, based on a methodology of project work, using technology as a strategy to facilitate the learning of the topic Hypothesis Testing by students of the Computer engineering program, polytechnic higher education.

In the following sections, theoretical aspects of the project work methodology in Statistics (relevant for the present study), the research method followed, the project works implementation, the students’ perceptions about the project work experienced and, finally, the conclusion that highlights the main results obtained and extracts the implications of the study for the learning of hypothesis tests.

BACKGROUND

In a statistical project with an investigative nature, is expected that the student use quantitative methodologies, integrating language and statistical methods into a more global research process (Batanero, 2001). In this investigative process, students should formulate questions and plan studies that will enable them to answer the same questions, make decisions about the type of collected data and their analysis and interpretation, and finally draw conclusions. If the conclusions reached do not answer the study questions, it will be necessary to collect new data and / or reformulate the research questions. After the study, the students communicate the results obtained, defending the options taken and the interpretations made.

Fernandes, Viseu, Fernandes, Silva and Duarte (2009), through the review of several studies about statistics teaching in basic education, concluded that “the exploration of tasks was almost always in the phases of treatment, interpretation of data, and were rarely directed to other phases of the statistical method “(p 3444), thus leading to a very focused learning of statistics in calculation processes and graphing representation.

Analogously, Wild and Pfannkuch (1999) propose the PPDAC model (problem, plan, data, analysis and conclusions), which they call the investigative cycle. In general, these phases, which are assumed to be the main stages in the implementation of an investigative project, are also adopted by other authors (eg, Batanero, 2001; Batanero & Díaz, 2011; Holmes, 1997). In this same study, Wild and Pfankuch (1999) identify different types of statistical reasoning, that constitute the basis of statistical thinking: 1) recognition of the data need, that is related with the recognition that our personal experiences are insufficient to support decision making; 2) trans numeration, which refers to the ability to change
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