

## **IMPROVING THE TEACHING OF STATISTICS, MATHEMATICS AND COMPUTERS: AN ANALYSIS OF SURVEY RESULTS BETWEEN GREEK UNDERGRADUATE STUDENTS**

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### **ABSTRACT**

Statistics and computers anxiety is experienced by 80% of students studying Social Sciences (Onwuegbuzie and Wilson, 2003). In this paper we aim to find the factors that contribute in feelings of anxiety experienced by Greek students studying Statistics, Mathematics and Statistical Software packages, such as SPSS and MS Excel. We analyse the results of a survey undertaken between 500 undergraduate Greek students at Technological Educational Institutions and at Universities in Athens.

The questionnaire consists of sections : (a) Uses of computing software packages, with Cronbach Alfa=0,90. (b) factors of statistics anxiety, with Cronbach Alfa=0,80. We performed an exploratory Factor Analysis and we found the following factors which contribute to Statistics Anxiety : Study of Statistics in the last year of High School, type of High School attended, Study of Mathematics in the last year of High School, study and applications of Statistics, Examination in the Course of Statistics, System of beliefs about Statistics, Attitudes of the teachers of statistics towards their students. The above factors explain 54% of the variance in the model. We applied Multinomial Logistic Regression with dependent variable : Anxiety during the study of Statistics. The dependent variables were the above factors which we found with the technique of Factor Analysis. Results show that the logistic full Model containing all predictors was statistically significant with  $\chi^2=396,27$ , with  $df=340$  and  $p\text{-value}=0,019 < 0,05$  =level of significance.

The above results indicate that the model was able to distinguish between respondents who reported and did not report that they had anxiety when studying for statistics exams. The model as a whole explained between 17.3% (Cox and Snell R-Squared) and 19,0% (Nagelkerke R-Squared) of the Variance in Anxiety Status and correctly classified 94% of people who had some anxiety when studying Statistics.

The following three independent variables made a unique statistically significant contribution to the model:

1. Type of High School (Directed towards Mathematical, Applied or Theoretical Subjects), 2. Study of Statistics in the last year of High School, 3. Study of Mathematics in the last year of High School.

We assessed a model which examines whether statistical anxiety, statistical software efficacy and computer attitudes affect perceived ease of use, perceived usefulness and behavioural intentions for using a statistical software.

This model was the Technology Acceptance Model (TAM) extension based on Hsu et al (2009). We applied Structural Equation Modelling, using SPSS and LISREL packages, with the following results:

Statistics Anxiety of a student makes intention to use statistical software less likely due to less perceived usefulness and less perceived ease of use.

Positive computer attitudes and Statistical software self-efficacy contribute to perceived usefulness and ease of use and ultimately to intention to use Statistical Software packages.

**Key words:** Statistics Anxiety, Factor Analysis, Multinomial Logistic Regression, Structural Equation Modelling.

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