"TEACHING STATISTICS: IDEAS & TOOLS": A PROPOSAL FOR A PROFESSIONAL REFRESHER COURSE FOR HIGH-SCHOOL TEACHERS IN TUSCANY

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GOALS: Statistics is a key competence for the citizens of modern society. Skills in statistics have a central role in supporting critical reasoning: they allow to understand quantitative evidences about society, to activate informed decision-making and to evaluate its results on an informed basis. For this reason, in Italy for many years now, Statistics is part of the educational process in the school system and its role in the curriculum has been strengthened over years. Despite this, few teachers have formal training or applied experience with statistical concepts. There's thus a need to support them in their efforts to master the content and incorporate it in their lectures. To meet this need, in the 2014-2015 school year, the Department of Statistics, Computer Science, and Applications - University of Florence (DiSIA) and Istat, Italian National Institute of Statistics, Office for Tuscany, jointly organized a professional refresher course for in-service high-school teachers.

DESIGN: The main objective of teaching Statistics is to help students developing their critical thinking. Teachers should have the expertise for an effective teaching of the statistical reasoning and of the use of data. For this reason, the training proposal was designed to meet the need of teachers to have both a broad theoretical and conceptual basis, and guidance for teaching materials and applications that can be appropriate for students' maturity levels. The training course was organized in two distinct areas: the first part, "IDEAS", held by DiSIA, to cover a deeper theoretical understanding of statistical concepts; the second part, "TOOLS", held by Istat, to facilitate the use of data in the classes, through direct experiences on official statistics.

RESULTS: The theoretical lessons focused on four topics: Descriptive Statistics; Relationships between variables; Probability and Statistics; Sampling and statistical inference. The second section was dedicated to some innovative learning tools and applications to promote a "learning by doing" approach for involving students actively on official data and using advanced tools for statistical analysis. All the seminars have been set as simulations of real lessons in a class, using approaches and examples considered useful for an effective teaching and discussing them with the teachers. The course has been run in different areas of Tuscany for the high number of registrations: about one hundred teachers attended.

IMPLICATION FOR THEORY & PRACTICE: From this experience, we realized that structured interventions are needed, to improve the statistical competencies of teachers. For prospective teachers, it is necessary to plan *ad hoc* university courses; for in-service teachers, there's the need for refresher courses.

IMPORTANCE: The role of teachers is vital to disseminate the importance of the statistical reasoning to understand the quantitative dimension of social phenomena, on a large scale, through the school system. Collaboration between DiSIA and Istat allowed to realize a pilot initiative whose contents and results can be a reference for future projects.

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In: J. Engel (Ed.), *Promoting understanding of statistics about society.*
Proceedings of the Roundtable Conference of the International Association of Statistics Education (IASE), July 2016, Berlin, Germany. iase-web.org/Conference_Proceedings.php