ABSTRACTS

BRUNO DE FINETTI, UN MATEMATICO GENIALE AL SERVIZIO DELLA SOCIETÀ (I)

BRUNO DE FINETTI, A MATHEMATICIAN OF GENIUS IN SERVICE OF SOCIETY (I)

MARIO BARRA

Summary: In the centenary of his birth, we try to give a complete picture of Bruno de Finetti's life, character, best scientific contributions in mathemathics and economy, of his philosophy and his research in didactics.

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L'AVVENTURA DI UN RICERCATORE

A RESEARCHER'S ADVENTURE

DONATA MARASINI

Summary: The "Researcher's adventure" is a summary of Luca Cavalli-Sforza's lecture hold at the University of Milano-Bicocca last October. During his speech about human evolution, Professor Cavalli-Sforza underlined four essential concepts: mutation, natural selection, genetic drift and migration. The first three ideas are strictly linked to chance therefore are treated through probability, the last one is treated through demography.

Human evolution goes with cultural evolution; with language the cultural evolution transfers knowledge, tradition, behaviour, way of thinking.

Professor Cavalli-Sforza proposed genetic trees about human evolution with Adam and Eve as African ancestors. Several times he stressed that probability, statistics and demography are essential tools in studying human and cultural evolution.

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IL METODO DELLA CATTURA-RICATTURA: UN ESPERIMENTO DIDATTICO TRA MATEMATICA E SCIENZE NATURALI

THE CAPTURE-RECAPTURE METHOD: A TEACHING EXPERIMENT INVOLVING STATISTICS, NATURAL SCIENCES AND EPIDEMIOLOGY

FLAVIA MASCIOLI · CARLA ROSSI

Summary: The capture-recapture method is a particular type of repeated sampling. It has been widely used to estimate the size of wildlife populations and recently it has found new applications to human populations.

In this note, we illustrate both applications of the method (biological and epidemiological) with the purpose of supplying teaching material which could be used in introductory statistics classes.

The capture-recapture model is a two sample model involving sampling without replacement from a finite population and use of hypergeometric distribution.

First we see how the estimator of population size can be obtained in a simple and intuitive way; we also show its equivalence to the estimator obtained with the maximum likelihood method.

Then we propose a simulation-based activity to illustrate some important concepts in statistics.

Simulating a capture-recapture experiment we discuss the concept of estimator, of sampling distribution and confidence interval. Varying the experiment parameters we compare different scenarios and discuss the properties of estimators.

The epidemiological application concerns the estimation of the size of hidden populations such as drug addicts and illegal immigrants.

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QUINDICI ANNI DI VITA DELLO IASE: MISSIONE E STRUMENTI

FIFTEEN YEARS OF IASE: MISSION AND INSTRUMENTS

GILBERTE SCHUYTEN · M. GABRIELLA OTTAVIANI

Summary: Statistics education (interpreted in the broadest sense possible) promotes the understanding of the basic concepts of statistics in society at large, as well as in other discipline areas and /or in other professional bodies and contributes to giving statistics more visibility. In order to further the improvement of statistics education at all levels and in all contexts, the International Statistical Institute (ISI) established in 1949 the Committee on Statistical Education, which ceased to exit in 1991 when the International Association for Statistical Education (IASE) was founded. In this paper we describe the work carried out by this association, and its role in promoting both statistics education and research in statistics education. It is mainly based on information available on the IASE web site, editorials and reports in the yearly «IASE Reviews».

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MATEMATICA E STATISTICA: UN LEGAME FORTE PER UN APPRENDIMENTO EFFICACE DI ENTRAMBE

BUILDING A STRONG LINK BETWEEN STATISTICS AND MATHEMATICS

FRANCESCA CONTI CANDORI · MARIA A. PANNONE

Summary: In this paper we illustrate the project “Mathematics Effectively: Thinking, Operating, Communicating (Through) Mathematics”. It is s a three-year project begun in 2005 in collaboration with the Regional School Authority of Umbria which has being carried out in the II and IV classes of primary school and the I classes of junior high school of the Region of Umbria and involves approximately 700 students.

It is a research-action project which intends to suggest innovative teaching strategies for a more effective learning of mathematics and statistics, taking also into account the guidelines of the new mathematics curriculum outlined in the recent reform of the Italian school system.

Statistics plays an important role in this project as a tool for knowing, representing and interpreting reality.

The project aims at:

- going into contents and methods of mathematics and statistics teaching also in the light of its concrete application to the study of real facts and events;
- stimulating a reflection with the teachers involved about what teaching strategies most enhance the acquisition of statistical and mathematical reasoning and their languages;
- enhancing effective learning of the nucleus "Data and predictions", using it as a cross-curricular subject involving mathematics and other subjects;
- providing proposals for learning units which highlight the practical relevance of mathematics and statistics.

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RAPPRESENTAZIONI GRAFICHE NELLA SCUOLA PRIMARIA: UNO STUDIO ESPLORATIVO

GRAPHIC REPRESENTATION IN PRIMARY SCHOOLS: AN EXPLORATORY ANALYSIS

MARIA PIA PERELLI D'ARGENZIO · SILIO RIGATTI LUCHINI
GIANFRANCO MONCECCHI

Summary: In traditional teaching the main teachers' effort is to explain the techniques necessary to create correct graphs, imposing in this way the adult vision of those instruments. Moreover, presenting children with graphs that have been previously created as well as teaching children how to create the graphs with Excel means to draw up a didactic contract between pupils and teachers that is removed as soon as children are away from the school environment.

In this paper we summarize the experience gathered from three specific contexts in the primary school. The first is the experiment carried out in the year 1999-2000 (2430 pupils from 133 classes: first, second and third year). The second experiment has been realized over the year 2004-05 (5 classes: fourth and fifth year). The third experience took place over the year 2005-06 in the European School of Parma (nursery school and primary school: first, second, third and following classes).

To comprehend the problems regarding the capability of creating and interpreting the graphs in the school it has been fundamental the freedom of each pupil of choosing the way to represent the data. This freedom was conditioned by the homework assigned: the best "informativeness" of the product.

Our main findings are:

- It is fundamental that the teachers, on the basis of the works produced by the pupils, employ the discussion in the class to start up a way to create graphs that are learnt by the pupils.
- The teachers, by means of the analysis of the pupils' works, are aware that there are difficulties concerning some concept (e.g. the proportion) that did not emerge before. For instance, there is a prevalence of the "colour" appearance and the children tend to underestimate the "informative" elements.
- It is fundamental, moreover, that the teachers know that to different kinds of data (qualitative, quantitative, etc.) correspond different kinds of representations. The teachers should also know the mathematics topics connected to the different representations.

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LA VALUTAZIONE DI UNA PROVA DI PROFITTO ATTRAVERSO UN MODELLO MULTILEVEL

RESULTS OF A PERFORMANCE TEST: A MULTILEVEL ANALYSIS

ORNELLA GIAMBALVO · ANNA MARIA MILITO · ANTONINO MARIO OLIVERI

The aim of the paper is to analyse the results of an assessment test, run to evaluate the statistics learning process in a group of students of the middle secondary school, by the multilevel analysis. The results show significant effects of the classrooms (teachers) and the schools in the learning processes.

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COOPERATIVE LEARNING: COME APPROFONDIRE L'APPRENDIMENTO DELLA STATISTICA *ON-LINE*

COOPERATIVE LEARNING: A WAY TO DEEPEN ON LINE STATISTICS LEARNING

STEFANIA MIGNANI · PAOLA MONARI
AURELIA ORLANDONI · ROBERTO RICCI

Summary: The paper describes a project involving *cooperative learning* of statistical topics implemented in a web environment. The project is the result of a fruitful partnership between the Faculty of Statistics of the University of Bologna and the Institute of Educational Research of the Emilia Romagna Region. The synergy between mathematics and statistics offers a concrete example of theoretical method application in order to investigate the real world. The positive effects of *cooperative learning* can be broadened to a larger learning-teaching community. It makes it possible to create a virtual place where it is possible to realize a *cooperative learning* milieu. This methodology is particularly useful for statistics, given both the specificity of the discipline and the fact that teaching of the subject often represents a novelty for mathematics teachers. Problems connected with real life are presented on the web and project participants may communicate through the network.

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IL VALORE DEI DATI: IL RACCONTO DI UN'ESPERIENZA PER PROMUOVERE E MIGLIORARE LA CULTURA STATISTICA

THE WORTH OF DATA: THE TALE OF AN EXPERIENCE FOR PROMOTING AND IMPROVING STATISTICAL LITERACY

GIOVANNI A. BARBIERI · PAOLA GIACCHÉ

Summary: Istat, the Italian national statistical institute, in co-operation with professors of statistics, scientific societies and experts in web communication, produced The Worth of Data, hypertext materials for promoting and improving statistical literacy. We present the experience from two viewpoints: (I) the process for designing and implementing hypertext; (II) and the ways selected for improving statistical literacy. The first aspect involved the decision to focus on the concept of awareness: not only as to when and how

to use statistical data, but also on how to be discerning about sources, their quality and reliabsility … The second aspect concerned the language and confirmed that to deliver content in plain language, without losing scientific precision, is indeed a difficult task. To achieve good results, it is necessary to make use of the various skills within a good team. Each expert should give up a little turf and contribute knowledge to attain a common outcome worth communicating.