

INDUZIONI

Demografia, probabilità, statistica a scuola

35 · 2007

- INDUZIONI è una rivista rivolta agli studenti ed ai docenti di matematica, storia, geografia, osservazioni scientifiche, economia, statistica... delle scuole preuniversitarie, ma anche ai docenti universitari. Il suo scopo è quello di diffondere idee statistiche nella scuola e di illustrare attraverso esempi come la statistica possa essere di ausilio in diverse occasioni della vita pratica.

Il taglio degli articoli dovrebbe essere operativo ed effettivamente utilizzabile nel lavoro scolastico.

- INDUZIONI is a review for students and teachers of mathematics, history, geography, scientific observations, economics and statistics at preuniversity schools, but also for university teachers. It aims to spread out statistical ideas in school and to illustrate, through examples, as statistics can assist us in several occasions of practical activities.

Articles should be operative and actual in classroom work.

- INDUZIONI viene pubblicata con il patrocinio della Società Italiana di Statistica (S.I.S.).

- INDUZIONI is published under the auspices of the Società Italiana di Statistica (S.I.S.)

- Comitato scientifico / *Scientific Board*: Giuseppe Burgio, Giuseppe Cichitelli, Giuseppe De Bartolo, Antonella Pinnelli, Silio Rigatti Luchini, Livia Linda Rondini, Carla Rossi, Romano Scozzafava, Alberto Zuliani.

- Fondatore / *Founder*: † Enzo Lombardo.

- Direttore / *Editor*: Maria Gabriella Ottaviani.

- Comitato di redazione / *Associate Editors*: Mario Barra, Anna Maria Birindelli, Giulianella Coletti, Corrado Crocetta, Ornella Giambalvo, Maria Pannone, Isabella Santini, Maria Rita Sebastiani.

SOMMARIO / CONTENTS

BRUNA BAGGIO, NADIA COLOMBO, *Valutare gli studenti per valutare i sistemi scolastici: gli strumenti di PISA 2006 / Student assessment used to evaluate educational systems: PISA 2006 instruments*

ESPERIENZE E MATERIALI / MATERIALS AND METHODS

MARINA PECI, FRANCESCO M. MORTATI, RICCARDO CARBINI, *Statistica e studenti, progetto SCQ – Scuola Conoscenza Qualità / School knowledge quality – statistical software for students*

FRANCESCA ABATE, *Giochiamo con la statistica: un progetto a sostegno della diffusione della cultura statistica tra i giovani / Let's play with statistics: a project for dissemination of statistical culture among young people*

DAL CONVEGNO REGIONALE SU: / REGIONAL CONFERENCE ON

“EDUCARE ALL'INCERTEZZA...COMPETENZE STATISTICHE

PER L'ESERCIZIO DI UNA CITTADINANZA ATTIVA” /

UNCERTAINTY AND STATISTICAL COMPETENCIES FOR AN ACTIVE CITIZENRY

BOLOGNA, 9 NOVEMBRE 2007 /BOLOGNA (ITALY) NOVEMBER 9, 2008

DANIELA COCCHI, *La statistica aiuta a decidere / Statistics helps to decide*

PAOLA MONARI, *Filogenesi dell'incertezza / The phylogenesis of uncertainty*

ROSSELLA GARUTI, AURELIA ORLANDONI, *Educare all'incertezza: le competenze statistiche di base / Bring up to uncertainty: statistical literacy*

BEATRICE GALLERANI, MARCO MOSCA, *1, 2, 3... ACQUA! Competenze statistiche e corretto uso domestico dell'acqua / 1, 2, 3 ... water! Statistical skills and the correct domestic use of water*

MARIA GIOVANNA PAPOFF, *Indagine statistica su: “Come ci alimentiamo”. Progetto m@t.abel / My food log*

RAFFAELLA BERTAGNONI, *FARE storia con la statistica / Studying history through statistics*

CLAUDIO MASSA, *Orientamento “sul campo”: un progetto con la Facoltà di Scienze statistiche dell'Università di Bologna / Counselling on the field: a project with the faculty of statistical sciences of the University of Bologna*

QUADRANTE NAZIONALE / NATIONAL NEWS

MPI, *Il 17 giugno, per la prima volta, una prova scritta nazionale negli esami di terza media / The first national final test for lower secondary school students: June 17, 2008*

ABSTRACTS

STUDENT ASSESSMENT USED TO EVALUATE EDUCATIONAL SYSTEMS: PISA 2006 INSTRUMENTS

BRUNA BAGGIO · NADIA COLOMBO

The PISA (*Programme for International Student Assessment*) project is an international survey promoted by OECD which aims to monitor the effectiveness of education systems and to assess the results obtained by 15-year-old students in terms of knowledge and skills.

The aim of this paper is to analyze the assessment instruments used in PISA, trying to highlight how the guidelines and the framework underlying the Programme can provide ideas for a debate within schools on its possible impact on teaching and assessing methods. In particular, the analysis will focus on the sciences (2006 main assessment domain) and will consider the *framework* – i.e. the conceptual reference frame encompassing the knowledge, competencies and attitudes being assessed, the *test items* covering the different fields of competence and the *scales* used to describe the proficiency levels.

*

MATERIALS AND METHODS

SCHOOL KNOWLEDGE QUALITY STATISTICAL SOFTWARE FOR STUDENTS

MARINA PECCI · FRANCESCO M. MORTATI · RICCARDO CARBINI

The software (940Kb) stems from a 2006 pilot project carried out together with the Margherita di Savoia Institute, an upper secondary school in Rome (Italy).

A students team, trained by specific meetings with the Istat (the Italian National Statistical Institute) staff, carried out a survey on the whole school population. The questionnaire has been focused on the youths situation (behaviour, values, habits etc.). Data were analysed by the Istat working group and, afterwards, 12 tables/graphs were selected in order to develop generalized software. This software is a tool for every other school interested in developing similar experiences.

SCQ acronym means Scuola Conoscenza Qualità (School, Knowledge, Quality). The letter S also means Simplicity because the use of the software is very friendly. The educational value of this experience is clear but, in order to obtain better results from a statistical point of view, the training of teachers is fundamental: as a matter of fact teachers have the task to clarify the logical statistical processes from data to complex statistical information.

The software is aimed at upper secondary school students.

*

LET'S PLAY WITH STATISTICS: A PROJECT FOR DISSEMINATION OF STATISTICAL CULTURE AMONG YOUNG PEOPLE

FRANCESCA ABATE

Among the activities of promotion and dissemination of statistical culture, for several years, the National Institute of Statistics (ISTAT) has conducted some initiatives intended for young people and lower and upper secondary schools.

The ISTAT regional office for Sicily in Palermo (Italy) has conducted a project, with the collaboration of the municipal statistical office, intended for some urban state lower secondary schools. The basic concepts of statistics have been explained to the students through the use of the 14th population and housing census data (2001) of the urban areas. The young researchers have built charts and graphs and have made everything cheerful by including drawings in colour. So they have been able to know the reality that surrounds them from the social and economic point of view. The job of searching the disk on the demographic, employment and housing situation of their city has been combined with that in the field, through a real statistical survey on "Lifestyles and time use" and the family relationships of the students involved in the project.

The students have introduced the results of their job in a Conference, in the presence of exponents of the public and private local institutions.

UNCERTAINTY AND STATISTICAL COMPETENCIES FOR AN ACTIVE CITIZENRY
BOLOGNA, 9 NOVEMBRE 2007 /BOLOGNA (ITALY) NOVEMBER 9, 2008

STATISTICS HELPS TO DECIDE

DANIELA COCCHI

Statistics deals with quantitative problems by managing variability and uncertainty. This does not mean that each statistician could give different answers to the same problem. Rather, using statistics correctly means to reason in order clearly elucidate the hypotheses that are stated. The paper summarizes two known cases where statistics was used correctly, showing the difference compared to other disciplines. Two unexpected examples found in modern novels, where statistical ideas are treated, are illustrated.

*

THE PHYLOGENESIS OF UNCERTAINTY

PAOLA MONARI

Man has always lived with the uncertainty of world events. We can identify three fundamental moments regarding the method used to confront uncertainty, which map out the history of rational thinking towards conquering the idea of probability. For many millennia man has faced the unknown by questioning oracles, augurs and priests in order to know his own destiny. These last ones did read the signs or entrusted their answers to casual procedures such as the throwing of dice or astragals. Dice and astragals have had their own fundamental role in this adventure, either as fate games, or as variability models of events.

It was only in the 1500's that the habit of gambling led to the birth of combinatorial analysis and it was only in the 1600's, with Pascal, that the theory of probability was born.

Nowadays modern science speaks the statistical language and uncertainty is no longer an obstacle to be eliminated, but the preliminary must used in order to explain the phenomena of life.

*

BRING UP TO UNCERTAINTY: STATISTICAL LITERACY

ROSSELLA GARUTI · AURELIA ORLANDONI

In the first part of this paper we describe some activities that involved teachers of the Emilia-Romagna region in different projects about teaching-learning Statistics. The aim was to increase students' statistical competencies. In the second part we describe in detail a case study that involved more than 600 students about understanding of statistical and classical probability.

1, 2, 3 ... WATER! STATISTICAL SKILLS AND THE CORRECT DOMESTIC USE OF WATER

BEATRICE GALLERANI · MARCO MOSCA

The activity, offered to the students of the first class of a secondary school in Cento (Ferrara – Italy), has been realized by the Italian\History\Geography teachers, with the co-operation of the Maths\Science teachers for the statistical investigations and of the Information Science and Technology teachers concerning the creation of graphs.

Water seems a subject particularly suitable for the development of an interdisciplinary learning unit and a valuable opportunity to invite the use of statistical enquiries. Through this, students are asked to express themselves and analyse in a critical way the reality of their own daily habits, and to learn modes of research they are not familiar with.

MY FOOD LOG

MARIA GIOVANNA PAPOFF

The paper describes a statistical survey about food. The research took place in February 2007 in three classes of the junior secondary school of Ozzano dell'Emilia (Bologna – Italy).

The aim of the activity was to give the students examples about statistical survey phases. Therefore, procedures about data collection, table construction, graphs, and understanding data are shown.

The design of a simple survey is the kind of work that helped pupils to learn by doing, so that topics like absolute and relative frequencies, means, and graphs became a shared finding of the whole class.

*

STUDYING HISTORY THROUGH STATISTICS

RAFFAELLA BERTAGNONI

The principal aim of the paper is to show how statistics can help to make clearer the causal relationships among historical phenomena. This latter aspect is crucial in order to understand the principal events of history.

Data, graphs, maps, and tables are used to lead students through different historical events so that they can catch causal connections and they can appreciate a more concrete way to understand how events follow each other.

*

COUNSELLING ON THE FIELD:
A PROJECT WITH THE COLLABORATION
OF THE FACULTY OF STATISTICAL SCIENCES
OF THE UNIVERSITY OF BOLOGNA

CLAUDIO MASSA

Some data from the 2006 AlmaDiploma survey, and some data from the publication titled “Training and work – occupational opportunities in Emilia Romagna 2003-2006” demonstrate that the economically-statistically oriented courses currently offer, and will offer in the future, a growing number of job opportunities. Based on these data, a new project on university counselling was designed in order to highlight just those university courses on economical-statistical disciplines which are often neglected and not very well known by students.

Previous experiences carried out in the last years with the Physics and Chemistry Department have shown that young students can learn quickly if they are personally involved in the projects. From this observation, the idea emerged of presenting the students attending the last year of a Scientific Lyceum with an analysis about the quality of their school, made in collaboration with of the Faculty of Statistical Sciences. The Faculty arranged a didactic and operational path designed to study the quality of the services offered by the school. Thanks to this direct involvement, students not only were able to focus on some particular aspects of Statistics (already part of their curricular programme) but could also learn some survey techniques and interpretative models used in this important professional field, while experiencing “curriculum counselling on the field”.