UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Statistics For The Social Sciences (blended)

2021-1-E2004P006

Learning area

Area n. 3: Study of socio-economical and cultural aspects related to communication processes

Learning objectives

Knowledge and understanding

Real-world investigation. Measurement Scales. From concepts to variables: operationalization of concepts into statistical measures. Data production methodology in official statistics, with special regard to the institutional role of the National Institute of Statistics - Istat. Istat in the supranational network of the European Union statistical information - Eurostat.

Descriptive statistics: the quantitative synthesis of psychosocial and behavioural phenomena. Uni- and bivariate analysis.

Introduction to statistical inference.

Applying knowledge and understanding

Statistical knowledge as interdisciplinarity. Recognizing and integrating data with other information sources.

Basic skills in data analysis techniques, in particular, applying software IBM SPSS, with mention to open source packages. Identification of crucial elements for the quantitative analysis of situations and phenomena. Proper setting of the statistical premises and of procedural steps. Computation or estimation of the identified elements by means of the selected packages. Suitable elaboration and understanding of analytical results. In official statistics, metadata recovering and data quality assuring. Critical reading of numerical information as reported in the different media.

Contents

The course provides students with theoretical knowledge and analytical tools for processing qualitative and quali-quantitative data. Methods for data production are explored with reference to official domestic statistics as part of the Eurostat network. The operationalization of concepts and phenomena, the identification of their measurement scales are explained with reference to multidisciplinary fields, in the first place referred to acquired undergraduate courses. The didactic promotes self-directed learning in statistical-computational reasoning, in mastering basic data analysis skills and in accessing numerical information disseminated both by official agencies and in the media. Embracing the didactical distinction between descriptive and inferential statistics, the course sketches also experimental statistics. So-called self-reported data are faced mainly in the context of participation and e-participation.

Detailed program

· Measurement scales.

· Data collection.

·Official statistics. Types of data collection and surveys.

· Data quality: concepts and definitions.

· Statistical variables. Graphical representation.

· Measures of synthesis and position. Herzel.

· Variability and dispersion.

· Ratios and indexes. Composite indicators.

· Bivariate analysis. Contingency, Spearman and Pearson correlation.

· Principles of probability. Notable probability distributions. From population to samples.

· Inference: hypothesis testing and confidence intervals.

· Test of hypothesis for the difference of two means: the cases of independent or paired samples.

·Null hypothesis testing in bivariate analysis.

Prerequisites

Base math: high school commonly shared knowledge.

Informatics: competences related to the first-semester course are required. A revision of basic informatics knowledge will be performed hands-on in computer laboratories. Specific support paths will be devised when needed.

Teaching methods

The course includes both frontal lessons and computer laboratory applications.

The first module develops along with two thematic modules. The first module concerns statistical methodology, with emphasis on the meaning and the rationale at the basis of statistics analytical concepts. Mastering access to official statistics is at the core of the second thematic module. Istat web site as a node of the Eurostat network, together with their open database, is widely explored with reference to various disciplinary fields. Students practice how to retrieve the online documentation of interest, taking into account data quality assurance and metadata retrieval.

Computer-assisted practise develops along with the two modules aforementioned, so as to apply the learned concepts, by means respectively of IBM Spss software together with open-source packages for statistical computation and of direct exploration of statistical websites for official statistics. Hands-on activities are integrated with exercises and simulations on the didactic web platform.

Some lessons are devoted to integrating the two modules, placing the methodological measures within the current widely accessible statistical information. The devoted teaching strategy consists of the discussion of the data streaming in the media also in light of the comparison with official sources. Such a discussion is privileged in groups on the basis of themes of interest.

Assessment methods

The examination is composed of two parts, in two distinct moments.

Moving from the topics faced in the classroom and even from other undergraduate courses, every student develops a critical reading of official statistics related to a chosen topic in a project work. The latter explicits the logic in choosing the topic, its methodological identification together with its proper metadata, its semantic delimitation. Therefore the chosen official statistical topic is critically compared with current general information, as provided by a couple of media extracts. At the student's discretion, the project work may be completed *in itinere,* within an established date, else within the terms for enrolling to the final examination.

The final examination is computerized and it consists of the statistical design and solution of problems, in the context of a descriptive and inferential analysis on a data set that simulates real cases. The step-by-step solution to the exercises is performed by means of the IBM Spss software, and answers are provided as numerical closed quizzes or multiple-choice tests. Thereafter, two open questions in the form of componement ascertain the actual understanding of the methods implied and the problem-solving attitude on a computational-statistical ground. The computerised examination is completed with the production of statistical graphs, due to their relevance in nowadays data information.

Upon student's or professor's request, an oral examination can integrate the computerized exam spacing on all the course topics, with open questions. The written evaluation can either increase or decrease the final grade up to a maximum of 2 points.

The modality of such exam will be updated in accordance with the rules for COVID-19 emergency.

Textbooks and Reading Materials

Aron, A., Coups, E.J., Aron, E.N. (2018). *Fondamenti di Statistica. Introduzione alla Ricerca in Psicologia.* Pearson Editore. ISBN: 9788891905185

Digital edition: ISBN9788891911841