TEACHING STATISTICS (11-18) IN ITALY AND THE ACTIVITY OF THE "SOCIETA' ITALIANA DI STATISTICA"

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In Italy 11 to 13 year old students go to the Lower Secondary School for a uniform scholastic program and to complete their compulsory education. After this students may choose to go to a variety of Upper Secondary Schools different in the length of their study programs (5, 4, or 3 years) as well as their study specializations (scientific/classical,technical, artistic, teacher training, professional training).

In the Lower Secondary School the teaching of Statistics and Probability was introduced in the 1979 new program. An examination of programs of the Lower Secondary School shows that in the mathematics program, the theoretical foundations of Statistics and Probability are presented as possible study areas, while in the geography, history and technical education programs, Statistics is an instrument of research for the understanding of pertinent social, economic and demographic phenomena.

Not all Upper Secondary Schools teach Statistics and Probability. Only technical and professional instruction provides, in some specializations and at different levels, for the study of Statistics and Probability in the last years of School (classes III, IV, V – Table 1). Combinatorics and Probability when taught are always part of the mathematics program. Similarly Statistics can be found in the mathematics program, only if it includes Probability. Otherwise it is a part of the program of subjects concerned with economics, finance and so on.

Notwithstanding the multiplicity of study areas and different levels which include Statistical and Probabilistic studies, the actual numbers of students who effectively come into contact with these disciplines during their Upper Secondary School studies are limited.

Of the total number of Upper Secondary School students in the school year 1983-84 those who studied Statistics and Probability were 7.5% of III class, 5.3% of IV class and 10.2% of V class students.

Reform projects have been under study in which mathematicians have proposed the introduction of Statistics and Probability into the mathematics program for all Upper Secondary Schools. At this moment the reform is still under discussion and it is not easy to predict how much time will be needed to reach an agreement.

At this moment, apart from the contents of programs,the most serious problem for the teaching of Statistics in Italy is whether it is being effectively taught because of the limited preparation of teachers actively involved in the teaching of these programs.

Table 1
Statistics and Probability Studies in Upper Secondary Schools (III, IV, V indicate the classes where this teaching occurs)

Type of School	Subject	Topics of Statistics and Probability							
		S_1	S_2	S_3	C	P_1	P_2	P_3	A
1. Technical Industrial Institutes									
a) Cybernetics	Probability, Statistics, Operational Research	III	III	V	III	IV	IV	IV	
2. Technical Institutes for Commerce									
a) International Commerce	Mathematics, Financial Mathematics,								
b) Administration Commerce	Methodological Statistics	IV	IV			IV	IV		
c) Merchantizing	Economics, Public Finance, Statistics								V
d) Computer Programming	Mathematics, Probability, Statistics	III	III	V	III	IV	IV		
	Economics, Public Finance, Economic Statistics								V
3. Technical Institutes for Accountancy and Foreign Correspondance	Mathematics, Applied Mathematics, Statistics	III	III	V	III	IV	IV	IV	
4. Technical Institutes for Girls									
a) Dietetics	Accountancy, Financial Mathematics, Statistics	V							
d) Community Organisation	Accountancy and Statistics	V	V						
5. Technical Institutes for Turism	Economics, Statistics, Public Finance	III	III						
6. Professional Training Institutes for Administration and Commerce									
a) Secretarial Sciences (*)	Economics, Public Finance, Statistics	V	V						V
b) Commercial Administration (*)	Informatics, Statistics for Management	V	V						V
c) Accounting Analysis									
	(*) Also Mahtematics				V	V			
7. Professional Training Institutes for turism and Hotel Organisation	Business Organisationa and Statistics	IV							
8. Professional Training Institutes for Industry									
a) Technicians for Chemical Industries	Mathematics	IV	IV		V	V	V		
b) Technicians for Electronics and Industrial Electricians									
9. Professional Training Institutes for Commerce									
a) Management Accounting	Applied Mathematics	III				III			
10. Professional Training Schools for Girls									
a) Fashion Design									
b) Graphics and Publicity	Mathematics	V	V		V				
c) Child Community Care									

Topics of Statistics and Probability

S_1 = Collection of Data, Graph and Table Representation; S_2 = Descriptive Statistics; S_3 = Statistical Relationship and Inferential Statistics;

C = Outline of Combinatorics; P_1 = Basic Concepts for Probability; P_2 = Foundamental of Probability and their Application; P_3 = Laws of Probability and Frequency Distributions.

A = Data Sources and Specific Statistical Applications.

In the Lower Secondary School, maths, physics, chemistry and natural sciences are taught largely by teachers for whom Statistics was not a part of their university preparation. While of the teachers who only utilize Statistics, few have passed an examination in this subject.

As already stated, in the Upper Secondary Schools the teaching of Statistics is part of maths or economics or finance, etc. Teachers with degrees in disciplines other than Statistics are numerically superior to those coming from degree courses in Statistics and it is therefore likely that those parts of the program which do not concern Statistics are favoured in the actual teaching.

At this moment however there is a revival of interest in Statistics on the part of teachers of all subjects including Statistical theory and its application both because of the need to use quantitative information through tables and graphs and because of the growing importance of Informatics.

For sometime the Societa Italiana di Statistica (Italian Statistical Society – S.I.S.) has been interested in the promotion of a vaster diffusion and comprehension of the Statistical "mentality" with particular attention to the link which this could have with the school environment. The beginning of this promotion could be said to have coincided with a Round Table Conference about the teaching of Statistics organised in 1970.[1] The aim of the Conference was the promotion of discussion among Statisticians with the aim of highlighting the possible directions that the organisation of Statistical Studies could take. Nine years before the reform of the Lower Secondary School, the "Commission for the Study of Pre-University Teacher Training in Statistics", chaired by B. de Finetti proposed to the Round Table that the teaching of Statistics should be included in maths and scientific observation courses and data and information concerning demographic, economic and social phenomena should be taught by geography, history and civil education teachers. For the Upper Secondary School the same Commission observed that the maths program could permit the introduction of examples and application of statistical instruments and methods. The Commission proposed that in Technical Institutes the study of Statistics could perhaps be increased depending on the specialization needs of the different schools and it suggested the creation of technicians for Statistics and for the electronic elaboration of data.

The Conference had reached its predetermined aim of encouraging Statisticians to reflect on the state of pre-university teaching of Statistics. So So, at the XXVII Scientific Meeting of the S.I.S. in 1972, E. Lombardo[2] was able to return to the theme of pre-university teaching of Statistics and Demography and underline its importance.

In 1975 the main theme of the XXVIII Meeting of the S.I.S. was "The Present Role of Statistics in Relation to Research, Education and Professional Activities". On that occasion E. Lombardo and A. Pinnelli[3] presented a paper called "Some Problems in the Teaching of Statistics and Demography in the Primary and Secondary School". In that paper they talked of the Italian experience with "experimental teaching" in Primary and Secondary Schools. These experiences were largely related to issues concerning research and its methods. The authors indicated that the Faculties of Statis-

tics and Economics/Commerce had contributed little to the teaching of Statistics compared with other faculties. Their lack of involvement in deeper textual research for pre-university schools, in the formation of teachers with an interdisciplinary view and in the development of interdisciplinary refresher courses for teachers was notable. E. Lombardo and A. Pinnelli encouraged the S.I.S. to take on the job of assuming and co-ordinating initiatives for the renewal of the methods and contents of school teaching.

In April 1979 the Steering Committee of the S.I.S. formed a Commission coordinated by A. Zuliani to discuss "The Role of Statistics in Compulsory Education and in the Upper Secondary School". The aim of this Commission was to experiment and verify didactic experiments, to diffuse the results of these experiments and to help teachers involved in pre-university teaching and application of Statistics. Thus the idea of pre-university Statistics teaching had developed into the research phase involving the individualization of didactical instruments and methods more suitable to the importance that Statistics and Probability should assume in a more modern school program.

By September 1979 the Commission had organised a Conference on "Pre-University Teaching of Statistics with Particular Reference to the Upper Secondary School".[4] From the Conference emerged, "the naturalness of the introduction of Statistics in pre-university schools" and the importance of the above to permit the student" to arrive at a more rigorous evaluation of the reality which surrounds him".

At the 1981 S.I.S. Conference, the Commission organised a Round Table on "The Role of Statistics in Cultural Formation in Compulsory Education and in the Upper Secondary School".[5] During this the Commission illustrated its main activities such as the analysis of statistical and demographic contents of mathematics, geography and technical education textbooks for the Lower Secondary School and the organisation of some refresher courses for secondary school teachers in Padua. A. Zuliani observed that the Commission had encountered great difficulty because on one hand, the art of teaching has less importance in Italian universities than other academic activities. And on the other, because of pre-university teacher resistance to new ideas owing to an almost inexistent preparation in Statistics and Probability. Having finished its work the Commission was dissolved and A. Zuliani asked the S.I.S. to develop a work group with the job of providing didactic materials in particular textbooks as reference points for pre-university teachers of Statistics.

In April 1984 the S.I.S. formed a new work group which was interested in "The Teaching of Statistical Disciplines for Pre-University Schools" coordinated by R. Leoni. This group proposed the preparation of documents to be presented to various university Faculties to promote the development of schools for specific purposes (scuole dirette a fini speciali), of specialization courses and for the establishment of specialised formation courses. This last task of the S.I.S. has more, concrete and operational aims because it encourages initiatives that link and support pre-university teaching. Therefore with these aims in mind preparatory and refresher programs for teachers were planned by E. Aureli and by R. Leoni. Their proposals were submitted to the Ministry of Public Education and to the appropriate local organisations. Unfortunately, the initial and lively inter-

est of government organizations has not been followed by a concrete realization of projects notwithstanding considerable pressure from the S.I.S.

The Italian Society of Statistics views with favour concrete initiatives which could guarantee a correct transmission and utilization of statistical knowledge in pre-university schools. Generally it is felt that Statistics should be taught by Statisticians. On the other hand, the same S.I.S. has remarked that differences of opinion – often ill-defined – exist between Statisticians, Mathematicians and Probabilistic Scholars about scientific, didactic and educational issues. The S.I.S. has therefore emphasized to the Ministry of Public Education and to other related authorities its request for and disponibility regarding a timely and up-to-date involvement in the correct application of new teaching programs in the Lower Secondary Schools, in the formation of Upper Secondary School programs and in the training of teachers in the discipline of Statistics.

The activities of the S.I.S. show how a lively and constant interest can positively influence the relevant government organisations in order to permit the formation of appropriate and up-to-date laws in the field of Education.

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See also:

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