Discussion on “Statistical education for life”

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First of all I want to thank Brian Phillips and Anne Hawkins for inviting me to be a discussant in this Invited Paper Meeting. “Statistical education on life” is a topic which really attracts me. I like it almost as much as the topic "Teaching and training multivariate data-analysis”, the Invited Paper Meeting I have organised and that I will present next week. In fact I have been working for a long time on Teaching and Training Statistics (particularly in what concerns Multivariate Data Analysis), giving courses, seminars or lectures to different kinds of attendants. There are students from different knowledge/background areas (students who are future mathematicians/ statisticians or students in psychology / education sciences / psycholinguistics or pharmacy, for instance) and from different graduation levels (pre-graduation, graduation, post-graduation and research in different areas). There are people who need in their own job, to understand basic or complex statistical concepts, to apply statistical techniques to their data, to interpret software results, or even only to be able to present in a proper manner their problems to a statistician.

Moreover I have been realising that contacts between statistical methodologists and users or potential users of statistics must be more and more improved and that such a goal can be accomplished by developing co-operation among institutions, like National Statistical Institutes, Universities, Private or State Institutions/Enterprises and Applied Statistical Societies. As a founder member and first president of the CLAD, Portuguese Association on Classification and Data Analysis, I think that interdisciplinary societies can and should play as well an important role in promoting this co-operation, and in improving and supplying continuing statistical education. Statistical Education should be planed as a result of those complementary efforts.

That holds particularly in what concerns the topics “Statistical Education of Judicial Decision Makers” in Forensic Sciences, “Official statistics dealing with the outside world”, or "Helping the public understand risk" in Health Sciences. All the three papers point out the need of statistical education of different kind of people, at different levels. Some aspects to think and discuss about in each case are included in the following three points:

1 - Statistical training and continuing education seems so important for professionals of some scientific community (for instance: judges, lawyers,...; medical doctors,...; professionals of statistical institutes,...) as it is important for trainers (for instance: statistical experts in forensic sciences; biostatisticians; technical staff of official statistics,...) - that is the training of the trainers - and, last but not least, for the end-users (for instance: members of a jury,...; patients,...; general public,...) that is, those who use the statistical services and therefore need to understand those services and terminology.

2 - Statistical education - either initial training, or continuing education – can take different forms: short courses, seminars, workshops, meetings, learning at distance, literature (published papers, abstracts,...), video teleconferencing, internet, computer/interactive training and others, eventually to be combined.

3 - Statistical education and funding - academic or other institutions funding - for Statistical Education should be considered a first priority point to take in account.

In “Justice by the Numbers: Educating Judicial Decision Makers, Mary Gray deals with public perception of the use of statistics in legal contexts, the legal status of statistical evidence and the role of a statistical expert inside and outside the courtroom. Methodological, ethical and legal issues are illustrated with cases and discussed. I was impressed by the way things happen nowadays at the United States in that concern. In my country statistics does not play yet such kind of role in forensic sciences. Moreover the cluster of statistical methods, which are already accepted in courtrooms, is quite interesting, and understandable to some extent, in a statistical point of view, as well as it is the cluster of methods that have not been adopted so far. I am happy that the courts for instance, have accepted confirmatory models such are regression methods, t-tests, and some non-parametric tests and urn techniques. As judgement is generally a complex multivariate decision, I feel, as a

statistician also familiar with multivariate data analysis, that a larger use of those techniques would be of great improvement in this particular field. Furthermore, methodologies such as hierarchical clustering models or correspondence analysis, not too difficult to teach, train and understand, specially in what concerns clustering techniques application and interpretation (in fact all we are intuitively doing clusters of things, of people, etc., everyday) could be an important help in the process of taking judicial decisions.

In “Official statistics dealing with the outside world”, Vincenzo Lo Moro reports his own view of the state of the art concerning the good and the bad relationships among National and Local Statistical Institutes, present users, potential users (specially students and researchers) of official statistics and general public. He specially refers to the way how presentation and communication of official statistics have evolved in the past recent years, the use of networking technologies in the promotion of self service data bank (warehouse) and the side of collecting data, that is, the respondents. He points out the role and the necessity to promote “closer encounter initiatives”, such as events, seminars, data shops, meeting points, media conferences with the users; information campaigns, booklets, widespread publications for the general public and potential users; development of communication policies to improve interest and self-interest to answer the questionnaires to the respondents. Of course all these points can be joined in the more general one, statistical education. Statistical education /training/teaching of users, potential users, general public, and at the same time, of technical staff. He tries to explain some of their ideas with a graphical representation (that is not clear for me), which suppose to give a global scheme of what it is called “an evolutionary model” for the relation between X: production / consumption (of official statistics) and Y: satisfaction / statistical education. This scheme seems to be suggested (not proved) by a particular example, concerning two surveys on users satisfaction in local statistical centres, on the basis of the assumption that there is a direct relation between X and Y. Despite my doubts on that “model” and corresponding interpretation, the conclusions come in the very same direction as to the previous papers. There is a strong need of organising and offering statistical education and training, which Vincenzo Lo Moro centres at the national statistical institutes with experts.

In "Helping the public understand risk", Amanda Burls reports her own particular experience on a case work, related to the Critical Appraisal Skills Programme (CASP) “in trying to help all those who make health care decisions make sense of scientific evidence”. Again this concerns not only general public, as well as patients and their families (actual users, potential users), but also “technical staff”: managers, carers, medical doctors, nurses, journalists etc. and statistical experts. The experience accomplished with a small sample of students, suggesting that the common idea of randomness is often the one of a “robotic” non-random uniform distribution, without any clusters, points out the real need of a permanent, intuitive but rigorous, statistical education. This work shows once more the importance to clarify and reinforce the relationships among statistical evidence, public perception of the use of statistics in medical contexts, and the role of statistical experts inside and outside the hospital: methodological, ethical and legal issues must be taken in account and discussed here, as well. I believe that, as Amanda Burls said, her work has important implications for doctors and health care providers and that training everyone together in multi-disciplinary workshops will give significant results, after some time.