

Experiencing Multidisciplinarity in an EMOS Master in Official Statistics

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Abstract

In this paper we present a report of some of the activities launched around the EMOS Master in Official Statistics and Social and Economic Indicators, launched in October 2016 at Complutense University of Madrid, stressing an essential characteristic of this project: the multidisciplinarity that Official Statistics needs. In fact, this master is a joint project of 8 Faculties that represents its core: Mathematics, Economics, Statistics, Sociology, Geography, Psychology, Informatics and Law. The objective was to cover as much as possible the different frameworks that meet into Official Statistics, counting in addition with the support of most of the members of the National Commission of Official Statistics led by the National Institute of Statistics (I.N.E.). Students need to spend the fourth semester at some of these institutions in charge of the production of official statistics in Spain. But the group of students itself represents an interesting heterogeneous team. The different views to each problem provided by these students coming from different fields indeed enrich the formation provided to our students. In order to assure the necessary background, a strict selection process is applied, and each one receives an almost personalized course plan during the first semester. Courses have been scheduled during the evening, so students can attend lectures after their work. Moreover, being aware of the extreme multidisciplinary knowledge that Official Statistics might require, Friday evenings were from the beginning mainly devoted to complementary courses, to be offered depending upon demand of any member of the National Commission of Official Statistics in Spain. For example, we were very soon asked to organize a 15-hour course on communication of official statistics, finally organized in collaboration with the Faculty of Communication Sciences at Complutense University. A 5-hour course on gender in Official Statistics was organized in collaboration with the Ministry of Education of the Government of Spain. Another 15-hour courses have been focused on the specific use of R language in Official Statistics, and advanced course on SAS (bringing teachers from SAS). Moreover, several workshops have been organized: on the one hand, in collaboration with the National Institute of Statistics (I.N.E.) we have launched the series of Workshops in Official Statistics and Social and Economic Indicators, held first at the Faculty of Economics (May 18, 2016) and then at the Faculty of Statistics (April 3, 2017); on the other hand, we have also launched a Workshop in Big Data and Social Networks and Social Analytics (November 24, 2017). Although the students coming from our EMOS Master have the preference to attend these courses and workshops, they are open to other students and professionals. In this way we expect to attract good students to our master, and also help Society to be conscious of the key role that official statistics play in their life.

Keywords: Education on official statistics, EMOS program, official statistician profile.

1. Introduction

The European Master program in Official Statistics, EMOS (see [1,2]), was launched by Eurostat in order to prepare a new generation of official statisticians, ready to continue building up the production standards needed in the European Statistical System and addressing the new paradigms associated to a society where the systematic observation of reality is becoming exhaustive due to the increasing portability of a cheap and easy electronic recording.

On one hand, we should remind the critical role sharing data plays in the construction of the European Union. Global policies and strategies should be designed from a set of informative standardized indices and statistics obtained from a complete and reliable description of a complex and heterogeneous community.

On the other hand, we should also stress the new paradigm Statistics is facing due to that exhaustive electronic recording of information. Somehow, if Statistics some years ago had to focus on the problem of how to get data (i.e., experiment design and sampling), now we are finding out that data are most probably the data we need, or something close enough, that they are somewhere available and perhaps it is easier and cheaper to obtain and analyse these data rather than spending time in the implementation of an experiment that sometimes has to be *ad hoc* designed.

These two arguments together, complexity and massive recording at different levels, makes Official Statistics a hot field for professional and research development.

But not too many students from Mathematics and related fields are applying to become official statisticians. Perhaps it is because Society is not fully aware of the absolute need of the official statistics service for our social and economic development. Perhaps students are not fully aware of the abilities and capacities of an official statistician beyond Official Statistics. Perhaps people do not fully realize what an official statistician is. Perhaps the professional profile of an official statistician is not yet well defined.

This paper focuses on the need of a social updating of the official statistician professional profile, to be made public with the collaboration of Eurostat, all those institutions producing official statistics (particularly the National European Institutes of Statistics), Universities and other educational institutions.

The comments below are based upon the experience obtained from the EMOS master on Official Statistics and Social and Economic Indicators [3], launched two years ago at Complutense University of Madrid, Spain.

2. Complexity within Official Statistics

Managing data and producing indices to homogeneously describe regions and states with respect to their main characteristics is not an easy task. Basic definitions and procedures have to be fixed, and implemented in different communities, which might show different social characteristics and even different technical and statistical limitations, cultures or traditions. Understanding data coming from different communities might require an *in situ* analysis in each one of these communities, to check specific circumstances that might be relevant but unexpected from other community. Moreover, managing data at such a high level requires a simultaneous production of key indices to be essentially maintained in time, although they might need a periodical revision in a Society that cannot stop evolving. More flexible indices and tools to capture in advance future tendencies are also needed.

Complexity and heterogeneity are key characteristics of the problems official statisticians address, subject to responsibility of offering representative and reliable information to governments and the whole Society, that should be able to access to such an information in order to make decisions and design strategic policies.

The job of an official statistician has many things in common to the job of other statisticians working for big groups and companies, but their service is for the whole society. Official statisticians should have not only the required statistical background, but also some knowledge about those social and economic concepts they will be managing. This is why the EMOS master at Complutense University was initially designed with the participation of 8 Faculties: Mathematics, Statistics, Economics, Sociology, Psychology, Geography, Informatics and Law (and the Faculty of Information Sciences participates in extra courses as requested by several national institutions producing official statistics).

Anyway, this is a main conflict in the field of Official Statistics, at least in Spain during past years: the social demand for statisticians with close profile to official statisticians has been so high, and the number of positions for official statisticians so low, that few

young students are being captured to the field of Official Statistics. Some kind of campaign or strategy should be developed to make sure that the job of official statistician is acknowledged by Society as a prestigious job. It would be desirable that a constant offer of official statistician jobs is offered year after year, but it is also needed some clear policy to assure the right perception of Society about the professional profile of official statisticians, and also more effort to make official data more easily accessible to Society. With this objective, the EMOS master at Complutense University is organizing every year a one-day meeting dedicated to Official Statistics, where relevant official statisticians are invited. The objective of this annual meeting is to make publicity about the role Official Statistics plays in our Society, and let people know the Official Statistics professional profile.

Since it is also desirable that even students at secondary school learn that they can know many things about Society by grasping on the data National Institutes of Statistics offer via their web sites, a number of activities for these students are being organized by the Faculty of Statistics and the Faculty of Mathematics.

In this way, Official Statistics will play the wide key role in innovation that should be an essential service not only to governments but also to Society. The capacity to launch and develop till success new social or economic projects is deeply dependant on having the access to the true information about Society, its needs and its demands, and the capacity to learn from data and capture tendencies and changes. In other words, an official statistician (if not individually at least the team) should have a clear multidisciplinary background.

The above approach, together with other specific technical challenges in Official Statistics, should also be useful to attract more creative specialists to the field, and to develop joint research projects between Eurostat, national producers of official statistics and universities.

3. About the new paradigm in Statistics

But, as already pointed out, the massive data being recorded in modern societies is forcing to change many procedures in official statistics. Indeed, due to the *Big Data* fever, Statistics is experiencing an incredible demand of professionals. Statistics are

now transversal as extra language skills and basic knowledge of informatics became transversal some years ago, when every company found out the absolute need of such extra language and informatics support. Each company, especially mobile network operators, banks and financial transaction enterprises, energy-providing companies,..., is now implementing not only a business intelligence division for the analysis of their data aimed at their own operational decisions but also (and more importantly) specialised units commercially exploiting their information producing statistical products in the market. The relationship between these products and official statistics needs statisticians in many aspects (storing, processing, interpreting,...).

So, a standard problem now is how to guarantee privacy and representativity from a huge but given set of data, and how to process this information, which not necessarily are numbers (see e.g., [4]). In fact, text analysis plays a key role for understanding many human activities, where available information can be also given in terms of graphics, photographs, movies, etc.

Official Statistics is fully aware about this problem, so EMOS masters have included in their programs the use of standard statistical tools, packages and languages, but also some courses on data mining and Big Data languages, plus a common module in English that allows the natural ERASMUS interchange of students.

Anyway, it is Eurostat and all official statistics producers, particularly the National Institutes of Statistics, the ones pointing out models and techniques to be taught at EMOS master. The requirement for EMOS students to have a period of practice at some institution producing official statistics is extremely important and should represent a good opportunity to launch joint projects with the University.

Another characteristic to be taken into account should be to assure certain flexibility to adapt and introduce improvements in master programs without provoking too much paper work and to organize the master in such a way that students can easily attend extra technical courses. At the EMOS master in Madrid, for example, Friday evening is devoted to extra courses that might change from one year to the next.

4. The Official Statistician profile

The previous considerations, in addition to specific statistical abilities, allow a first approach to the professional profile of official statistician to be specified to attract potential students to EMOS masters.

We are talking about a top statistician with a wide multidisciplinary background, able to work within a multidisciplinary team, able to manage machine learning techniques, to manage huge amounts of information subject to uncertainty in different formats, and able to search for useful indices and statistics obtained according to a strict, consistent and well defined methodology that fulfils privacy and other legal issues.

Such a profile is compatible with other specialists in Statistics, but it is important that the EMOS master profile is not exclusive in order to assure the future of the master. If we produce a too narrow EMOS profile restricted to official statistician, the future of EMOS masters can be put in risk since Eurostat and national governments do not usually offer too many positions for official statisticians. They can even temporarily stop offering positions.

5. Final comments

In this paper we claim to work towards a professional profile of official statistician that should be viewed by Society as an essential, technical, creative and reliable statistician that serves the whole Society. The future of EMOS masters might depend on the acknowledgement of this professional profile. We should indeed work for the prestige of the profession of official statistician, but previously official statistician should be perceived as a profession. This objective requires a series of actions at several levels of education, and also in media, so people learn that they can look directly to the information contained in easy Official Statistics web sites, and that students can serve community by means of a prestigious (and well paid) profession of official statistician. In this sense, the session on “promoting the value of official statistics” [5] and the session on “collaboration with the scientific community, communication with users” [6] at the Q2018 conference are particularly pertinent. But we cannot pursue prestige for a profession that is not being acknowledged by Society.

6. References

- [1] https://ec.europa.eu/eurostat/cros/content/emos_en
- [2] <http://ec.europa.eu/eurostat/web/european-statistical-system/emos>
- [3] <https://www.ucm.es/emos>
- [4] Montero, J. (2009), Fuzzy logic and Science, Studies in Fuzziness and Soft Computing 243:67-78.
- [5]. Burg, T. (chair session), Hansson, K., Helenius, R., Tucker, S., Zottoli, M., Laux, R., Hathoot, A. (2018), Proceedings of the Q2018 conference, Krakow, June 27-29, session 12.
- [6] Jajuga, K. (chair), Karlsson, A.M., Alshail, F., Gadouche, K., Zangenberg, C., Martinisi, A. (2018), Proceedings of the Q2018 conference, Krakow, June 27-29, session 13.