

# THE TRAINING OF STATISTICIANS: WHEN DEMAND FOR GRADUATES EXCEEDS OFFER

*Celina CURTI – Ernesto A. ROSA*

*Universidad Nacional de Tres de Febrero (UNTREF) – Degree Program in Statistics*

*Av. San Martín 2921 – Caseros – Prov. Buenos Aires – Rep. Argentina*

*ccurti@untref.edu.ar – erosa@untref.edu.ar*

## SUMMARY

In the Argentine Republic, there are two National Universities training graduates in Statistics: Rosario (1948) and Tres de Febrero (UNTREF) (1998).

UNTREF is located in the Great Buenos Aires and receives students from that region and from the City of Buenos Aires, thus fulfilling one of the objectives of its creation: to meet the demand for Statisticians in that area.

Almost 10 years have already passed since the first works were made with students enrolled and we are facing a worrying phenomenon: the demand for Statistics graduates persistently exceeds their offer, and the situation reaches the advanced students in the Degree Program, who start to fill the jobs that cannot be covered by the graduates.

The reasons for this situation are generated in the small number of enrollment of students in the Degree Program, and it has already been verified that one of the reasons is that it is difficult for those graduating from the secondary schools to understand what a Statistics graduate does, what their labor field is, etc., and that those enrolling in the Degree Program come, basically, from two sources:

- a. They have a previous Statistics knowledge because they are developing some related activity and they wish or need to have a university degree.
- b. They have some specific knowledge of the Degree Program through any close person already graduated or who is studying.

Faced to this, actions tending to revert this situation have begun to be developed basically aiming at two objectives:

1. The increase in the initial enrollment.
2. The retention of the students who are already in the Degree Program.

In this paper, the situation observed is described as well as its possible causes and the advertising activities to increase the interest and the enrollment in the Degree Program. In parallel, we aim at increasing the retention of the students enrolled.

## 1. INTRODUCTION

The Program in Statistics is not one of those that may be called “conventional” or “traditional” (such as Medicine, Law, Accounting, etc.), and not even by its name a person may have an idea about the competences it covers as it happens with other Programs not included in the previous group (e.g.: History, Geography, Anthropology, Computing, etc.).

This situation causes unawareness about its existence as a degree and about the job possibilities, and raises an interesting paradox: it is a discipline unknown as a degree but necessary in all the labor and research fields.

On the other hand, the popular Statistics vision or concept is related to numbers, tables, charts and, what is even worst, the mathematical formulas and demonstrations that from the beginning of the conventional education are rejected and feared by most of students. This association between Statistics and Mathematics has been the reason for not having much support among those planning to study at the university.

Finally, as it happens with many technology disciplines (Engineering, Agronomy, etc.), the use of the statistical methods in the production and marketing areas is closely related to the economic development and, therefore, the demand for statistical knowledge grows exponentially during the expansion periods.

Then, it is the combination of all these factors mentioned what probably causes the existence of the problem we are dealing with in this paper: **the training of statisticians: when demand for graduates exceeds offer**. In the following paragraphs, the problem is described and the actions developed in the UNTREF to face it are mentioned.

## 2. THE TRAINING OF STATISTICIANS

The training of Statisticians having a university level was started in Argentina by -at that time called- Universidad del Litoral (currently, Universidad Nacional de Rosario – UNR) in 1948 <sup>(1)</sup>, and the main objective set out then was the training of professionals able to supply the incipient public statistical system. Later, and related to the ups and downs economic development in the country, the training rotated until it also covered the needs in industry, commerce, services, etc.

The problem detected until mid-90s was that the UNR location, far from the Great Buenos Aires urban conglomerate, made the labor insertion of many of those graduating in Statistics difficult, although the excellent training given there and the lack of other similar programs allowed the spreading of Statisticians throughout the country as well as abroad and in the international organizations.

Even so, the number of graduates in Statistics was not enough to cope with the growing needs in the different fields of activity. This situation allowed the emergence of alternatives (postgraduate studies in Statistics) or that the demand for Statisticians was covered by professionals from other disciplines with some elementary knowledge in the subject. Also, the lack of a program in Statistics in the Buenos Aires Region was causing unawareness about it and that the positions requested were covered by professionals from other disciplines <sup>(2)</sup>.

There were some attempts to create degrees in Statistics in some public and private universities of the Buenos Aires region that did not prosper until 1997 when in the recently created UNTREF, the creation of a Bachelor's Degree in Statistics (with an intermediate Technical degree) was proposed, approved and started in 1998.

During the almost 10 years the Program is in force, **284** students enrolled in it, from which more than **60%** gave up their studies, **116** students remained attending classes regularly, **55** graduated as Technicians and **26** graduated as Bachelors.

## 3. THE DEMAND FOR STATISTICIANS

From the beginning of the program in the UNTREF and without making any special efforts to spread -during the first years- the existence of this program, demands for graduates or, failing that, for advanced students from the program in Statistics began to be received.

As from mid-2004, those requests were focused on a “job bank” in the UNTREF Program in Statistics, from which Statistics graduates or students were called to cover the vacancies in the positions offered.

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<sup>(1)</sup> In fact, this degree was the first created in Iberoamerica, and its roots go back to the year 1927, when Professor Carlos E. Dieulefait obtained the addition of a Statistics syllabus to the programs studied at the School of Law based in Rosario, Province of Santa Fe.

<sup>(2)</sup> According to the work areas where statistical procedures were required, the professionals from other disciplines covering the Statistics positions were: Sociologists, Accountants, Engineers, etc.

During the period between year 2004 and the end of March, 2007 (less than 4 years), **259** applications to cover positions, **144** cases for graduates and the remaining **115** for students, were received. To this, the jobs obtained privately by the UNTREF graduates and students have to be added.

Comparing these figures with those of the Enrolled and Regularly Attending Students and Graduates above, a difference between offer and demand is observed, and this does not take into account the cases verified before mid-2004 (with values lower in the following years due to the country economic crisis), with which the 400 positions required are exceeded.

The gap between the 144 graduates requested and the 26 generated by the UNTREF was covered, partly, by graduates from the UNR, in other cases by students from the UNTREF and in most of the cases by graduates from other disciplines having Statistics partial knowledge (Mathematicians, Sociologists, Economists, etc.).

#### **4. THE REASONS FOR THE PROBLEM**

Without considering a conclusive and final answer (3), some polls and inquiries made have determined that the basic reasons for that gap between demand and offer for Statisticians are given by:

1. Unawareness about the existence of a program in Statistics in a university based in the Great Buenos Aires.
2. Unawareness about the program objectives and competences as well as the field of activity of the graduates in Statistics.
3. Fear of the Mathematics contents in Statistics and of the efforts that attending to the subjects of the Syllabus would require.
4. The dropout existing in the university programs, also affecting the program in Statistics encouraged by the possibility to work in the subject without a need to be graduated.
5. The delay in the graduation due to the need –for those students who work– to resign hours of study and attendance in the interest of a higher dedication to their jobs.

These five factors cause a drop in the program enrollment or a decrease or a delay in the production of graduates, which reduces the **offer**; but the two following factors increase the **demand** for statistics knowledge and for graduates in this discipline.

6. The specific Statistics transversality, which reaches all the remaining disciplines and fields of activity, where statistics methods are required to solve problems and quantify situations and evolutions.
7. The economic growth and the need to understand the social complexity increases the need to apply statistical methods.

#### **5. ACTIONS DEVELOPED**

Although in the mentioned project submitted to the UNTREF a more precise verification of the impact of each one of those factors and the possible existence of others not detected is planned, it has been deemed convenient to act in order to try to reverse the growing gap between offer and demand for Statisticians. The actions performed up to the present are channeled in two directions: the **increase in the program initial enrollment** and the **retention of those studying** for the degree in Statistics.

With those purposes, the following activities were carried out:

##### **1st. Advertising about the existence of the Statistics Program among the potential students enrolled**

As from the year 2003, a note addressed to the Mathematics teachers in the last year of the Secondary education level was prepared asking for their collaboration to spread the existence of this program

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<sup>(3)</sup> Only this year a project has been presented in the UNTREF aiming at –among other objectives– determining precisely the reasons for that gap between demand and offer, which is increasingly extending over the time.

among their students, particularly among those who have excelled in this subject. In parallel, notes explaining the Statistics objectives and applications as well as the comparative advantages for the graduates in Statistics were addressed to the parents.

## 2nd. **High School Support Program**

As from 2004, the UNTREF has taken part in the High School Support Program together with other national universities.

This Program, promoted by the Argentine Ministry of Education, consists in giving the students who are finishing the secondary or high school level and who intend to continue their higher education studies a voluntary extracurricular course. A workshop is made with university and secondary teachers.

Among the activities scheduled, apart from Literature and text understanding, a module for the **interpretation of the statistical information** is given and those workshop spaces are very useful to advertise the UNTREF Program in Statistics, the professional profile and the labor placement of the future graduates.

## 3rd. **Unimedia Program**

The UNTREF has taken part in this Program through agreements with secondary schools from its area of influence as from the year 2005. Its main objective consists in improving the student transition between high school and university, working in two substantive areas such as Language and Mathematics.

In this latter area, workshops are made between the Statistics university teachers from the UNTREF and the high school heads of the Departments of Exact and Natural Sciences in order to prepare Mathematics brochures containing a chapter for Statistics.

These brochures are used by the high school teachers to teach their students and complement the bibliography they use; and it is through the presence of Statistics in this final part of high school that it is expected to reach more students interested in studying Statistics.

## 4th. **Understanding of the Quali-Quantitative Information in the UNTREF Entrance Course.**

In the UNTREF entrance course, a subject called Understanding of the Quali-Quantitative Information has been included three years ago containing the statistical analysis of said information.

The contents and the way the subject is given has been the reason -for some candidates to other UNTREF programs- to express their interest in the Statistics program.

## 5th. **Tutorship Program**

The UNTREF has implemented a tutorship program two years ago in those degrees having an initial enrollment lower than 50 students. The "tutor teachers" lead the students as from the entrance course, trying to solve the problems that appear during their studies and extending said support during the 1st year of each degree because it is during this year when the highest dropout occurs. The degree in Statistics is covered by said Program.

## 6th. **Amendments to the Syllabus of the Program in Statistics**

After five years this program was started in the UNTREF, amendments to the Syllabus were decided to be carried out in order to make the prerequisites of the subjects more flexible. Then, without substantially modifying their contents, delays in the graduation of the students were verified.