

The Master in Applied Statistics Program: Bilateral Academic Cooperation in the Philippines

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1. Background

The Master in Applied Statistics (MAS) program is an off-campus degree program of the Polytechnic University of the Philippines (PUP) and the National Statistics Office (NSO). In February 1979, Dr. Tito A. Mijares, then Executive Director of the NSO, signed a Memorandum of Agreement (MOA) with the PUP formalizing the MAS program as a bilateral academic cooperation between the state university and the government statistical agency. Under this MOA, PUP administers the MAS as part of its graduate program and NSO, from its end, provides free use of its training room, library and other educational facilities and make available qualified personnel to engage in part-time teaching in the PUP, particularly for the MAS program.

Dr. Mijares realized the pressing need for further studies in statistical theory, methods and analyses by those engaged in the practice of the science of gathering information for decision-making, particularly those who are employees of the NSO. For the next ten (10) years beginning in 1980, the MAS was made part of the six-month internal Statistics training program of the NSO. Program trainees were concurrently enrolled in the MAS program so that when they finish the training, they would have earned six (6) to nine (9) units leading to the MAS degree. They were attending the training at daytime and taking MAS courses in the evenings. Most of them continued taking courses even after the six-month training program, and some actually obtained the MAS degree while others moved on to other disciplines where they acquired their master's degrees.

2. The Program

Curriculum. There is a new MAS curriculum that is to be implemented this school year. It consists of three groups of subjects, namely core courses; major courses, including major electives, divided into two streams of either statistical methods or official statistics; and cognates, totaling to 42 graduate units.

The **core courses** include four (4) subjects in statistical analysis, statistical theory and methods of research, equivalent to 12 units. Another six (6) subjects, each equivalent to three (3) units, comprise the **major courses**, four of which are mandatory and two are electives. The mandatory subjects are Statistical Consulting, Statistical Data Processing, Survey Designs, and Census and Statistical Operations. In addition, the student is made to elect two (2) subjects offered in either of two streams: Statistical Methods consisting of Experimental Designs, Time Series Analysis and Forecasting, Multivariate Analysis. and Special Topics in Statistical Methodology; and Official Statistics, consisting of Demographic Analysis, Labor and Manpower Statistics,. Economic Statistics and National Accounts, and Special Topics in Applied Statistics. For **cognates**, students are to enroll in Seminar in Thesis Writing and any three-unit subject from other disciplines related to Statistics.

After completing all academic requirements, students are required to pass a comprehensive examination administered by the PUP Graduate School (PUPGS). Upon passing this examination,

the student proceeds to complete the remaining six (6) units by preparing a research project or thesis under the guidance of an adviser.

Teaching Staff. Faculty members of the MAS program have been drawn mostly from qualified NSO personnel, particularly those who have completed their graduate studies, either in Statistics, Economics, and Demography. They hold academic ranks at the PUPGS, teaching on a part-time basis. The NSO Administrator chairs the program and is also one of its professors.

In the absence of qualified personnel at the NSO during the early years of the program, professors were invited from different schools and universities, particularly, UP, UPLB, Ateneo de Manila University and PUP. Through the years, more and more NSO employees finished their graduate studies and became members of the MAS faculty.

At present, the MAS program has a pool of twelve (12) faculty members who are actively teaching or advising thesis students. Half of them are holding PhD degrees or have attained PhD level of graduate education while the rest have master's degrees. Years of practical experience in applied statistics of the faculty members range from seven (7) years to over 30 years, acquired from working for both the government and private sectors. Eight (8) of the MAS professors are from the NSO, most of whom are MAS graduates while the rest are from other statistical agencies or research units.

Graduates. The MAS program now has 27 graduates, the first one in 1982 and one or two graduates every year or two thereafter until 1995 (Table 1). In 1999, the program was able to graduate ten (10), and in 2000, seven (7) statisticians. The graduates in 1999 included six (6) who availed of the non-thesis option of the MAS program and three (3) Asian Development Bank (ADB) scholars from Cambodia. Five (5) of the graduates in 2000 were scholars from the Union of Myanmar under the Overseas Development Assistance (ODA) program of the Philippines.

The high number of graduates in 1999 and 2000 may be attributed to a number of factors. One, it was in 1997 when the MAS program aggressively addressed the growing number of inactive students who had finished the academic requirements. The non-thesis option which was available in the previous curriculum was offered to them. As a result, students had to satisfy the additional six (6) units and then, worked on their special projects and finished these in 1999. Two, the Civil Service Commission (CSC) in 1995 adopted a policy of requiring master's degrees for those to be promoted to management level positions. This motivated more students to finish their degrees. Lastly, the foreign students from Cambodia and Myanmar studied on a full-time basis and under a scholarship contract, that enabled them to finish the program within two-and-a-half years.

Table 1. Number of MAS Graduates by year.

Year	1982	1983	1984	1986	1987	1988	1990	1993	1995	1999	2000	Total
Number of Graduates	1	1	1	2	1	1	1	1	1	10	7	27

A minimum of two (2) to three (3) years was needed to complete the program, as achieved by the foreign students from Myanmar and Cambodia and a few local students, while the maximum was 16 years. The mean, median and mode number of years are six (6), four (4) and three (3) years, respectively. The average may be quite high compared to other graduate programs at PUP; while the median and the mode may be realistic for working students in the program. It should be noted that the foreign students and one of the local students were in the program on a full-time basis as they were under scholarship grants. Special arrangements were made for them such as offering some courses even if the minimum number of students required were not met, allowing them to take the comprehensive examination during their last semester and at the same time, write their master's thesis, etc. Excluding the foreign students, the mean, median and mode number of years to

complete the program are higher. For the typical MAS working student, a realistic time frame may be four (4) to five (5) years.

The topics of the master's theses of the MAS graduates have been diverse. The central theme has been the application of statistical methods to results of censuses and surveys or administrative-based statistics generated by NSO. Other MAS theses proposed alternative methodologies for some of the activities of the NSO. Foreign students utilized data from their home countries of Cambodia and Myanmar.

Enrollment. Many students of the MAS program are employees of the NSO. This is in keeping with the vision of the initiators of the program more than twenty years ago to continually develop the personnel of the NSO to increase their capabilities as professional statisticians. Of the 33 students enrolled last semester, 20 students, equivalent to 60 percent, were employees of the NSO. This proportion of NSO employees among the MAS studentry has remained at about this level for the past few years.

Baccalaureate degrees of current students have been mostly in Statistics, Mathematics, Economics and/or Engineering. Those who do not have enough background in calculus or linear algebra are encouraged to enroll a mathematics course during their first semester in the program.

Mean enrollment during the past 22 years of the program was 61 students per year. These include those who are non-NSO employees. Maximum enrollment was in 1984 at 106 students taking classes during the year, followed by 1987 at 104 students enrolled. Minimum enrollment was in 1990 at 22 students only. Mean enrollment from 1979-1988 was 84 students; thereafter, mean enrollment was reduced to half.

The proportion of NSO employees enrolling during the past 22 years of the MAS program averaged at 73 percent. A higher proportion of 81 percent was registered during the early years of the MAS when the program was still part of the Statistics training of the NSO. Recent enrollment shows an average proportion of enrolled NSO employees at about 56 percent.

Among the current students are three (3) from Cambodia under ADB scholarship. This is the second batch of Cambodian scholars from the ADB, with the first group having obtained their degrees in 1999.

3. Benefits Derived from Bilateral Cooperation

The NSO and PUP had to devise effective strategies to ensure that the objectives of the MAS program are met. While the initiative and motivation to run and maintain the program rest heavily on the NSO, the PUP found the program consistent with its policy of offering practical applications of technology. Moreover it has become prestigious for the PUP to have this course conducted by the top statisticians of the premier statistical institution in the country.

Time and venue of classes: Since the beginning, the MAS has been designed to cater to the young practicing statisticians, especially those at NSO. Classes are held in the evenings during weekdays and on weekends to enable working students to attend classes. Aside from this, classes are also conducted at the NSO Training Room, most of the students being from NSO so that they do not have to transfer to the PUP campus, even if this is only a block away.

Faculty experience: Faculty members, mostly coming from the NSO, are practicing survey statisticians, researchers and analysts. This ensures that the faculty members know intimately the practical applications of the theory they are teaching in the classrooms. They have the handle on the subject matters being taught in their most applied form. Current practices and developments in applied Statistics are imparted to students immediately.

Institutional support: Students are encouraged to finish the program so that at the same time, the NSO is able to upgrade its employees. As was done in the past, motivations were in the form of privileges to go on paid leave while preparing their master's thesis. At other times, those preparing

their theses were relieved from their usual post assignments so that they can work full-time on their research. In return, students were expected to finish within the timeframe given them and serve the NSO for a certain number of years upon obtaining the degree. Thesis fellowships have also been made available to provide financial support to the students' research.

Research inputs: The wealth of data at the NSO are made available to students for their course requirements and most especially, for their master's thesis. This is a big advantage of the MAS students since they need not gather nor search far for the data to use for their research. Students who are NSO employees can use the data they are most familiar with, that is, the dataset they are exposed to in their work at NSO. Access to data is also given to non-NSO students upon approval of a written request.

Productive use of data sets: This is also beneficial to NSO as most research projects of the MAS program are applications of statistical methods using datasets generated by the office or alternative methodologies that could be useful to Office programs and activities. This also provides a good opportunity for its data holdings, in terms of survey and census results, to be utilized further as research inputs.

4. Some Problems

The MAS program also has its downside. One of the pressing problems at present is the lack of faculty members who can teach courses and advise thesis students. As earlier mentioned, faculty members of the program are presently drawn from the NSO, with part-time teaching appointments from PUP. However, conflict between the demands of the regular NSO projects and teaching the MAS subjects makes many of them unavailable to handle subjects. This creates difficulties in scheduling course offerings during a semester as programmed.

In the same vein, students are also mostly part-time and also have this conflict between the pressures from their full-time job and the academic requirements of an MAS student. Moreover, at present, more than 30 students have already passed the comprehensive examinations and should be ready to do their theses. However, for lack of time and enough motivation to sit down and do research, coupled with the lack of faculty members who can guide them through the research process, these students remain to be potential MAS graduates.

5. Future Directions

Greater emphasis will be given to handling large data sets as this is a unique specialization that the MAS program, its faculty members particularly, can provide. The MAS should continue to be the master's degree of choice of the young professional statisticians needing advance education on statistics, more on the practice rather than the theory.

The MAS program should strive to increase the number of its graduates. Students should be given more encouragement and understanding to finish the degree. The MAS program is already successful at students completing the academic requirements and passing the comprehensive examinations. Efforts should be exerted at motivating students to conduct research and complete their master's theses.

RESUME

Mr. Africa was the Administrator of the National Statistics Office and the Civil Registrar General of the Philippines. Concurrently, he was the Chairman of the MAS program at the Polytechnic University of the Philippines. He is now the Director of the United Nations Statistical Institute for Asia and the Pacific in Makuhari, Chiba, Japan.

Ms. Ignacio was the Chief of the Design and Operations Division of the National Statistics Office Household Statistics Department upon her retirement. She remains as a member of the faculty of the MAS program.