CHAPTER 7

The Task of Training Statisticians in Nigeria

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7.1 INTRODUCTION

This account is aimed at outlining the present programme of training statisticians and would-be statisticians in Nigeria.

Some account of preparatory training at school level is given by Oyelese (1982); Statistical Education and training in general within the larger context of African framework is discussed in Adichie and Afonja (1982).

The twin problems of statistical education and training will be treated as one. To be reviewed will be the various ways by which people have become and are still becoming Statisticians, the institutional framework and the existing facilities.

7.2 THE EDUCATIONAL SYSTEM

No meaningful discussion of the training of Statisticians can be undertaken without some insight into the educational system.

The Nigerian Educational System is still very much a by-product of her British Colonial heritage. There are basically three levels – primary (ages 6 to 11) secondary 11 to 15 or 16 and tertiary. In between the secondary and tertiary levels are technical/vocational and teacher training colleges. At the tertiary level are the Polytechnics/Colleges of technology, the Advanced Colleges of Education, on the one hand, all meant for training what has come to be called middle level or Intermediate manpower. The Universities on the other hand form the highest level of tertiary education for producing the implied high level manpower, sometimes styled professionals.

With changing emphasis in orientation and duration from 5 to six years in secondary school over the years, the country is now moving towards what is now commonly called the 6–3–3–4 system. This corresponds to six years in primary, six in secondary divided into two halves of junior and senior and four in Universities. The place of Polytechnics, Colleges of Technology and Colleges of Education is yet to be clearly defined.

The training of Statisticians with its associated problems will be seen to fall roughly in line with the various Educational levels.

7.3 THE STATISTICIANS AND EARLY BEGINNINGS

Without worrying too much about who is a statistician, it suffices to say that historically statisticians were first found in government in Nigeria. They were either:

i) holders of Economics degree with varying degree of specialisations in statistics or
ii) holders of the associateship of the British Institute of Statisticians.

This was in the fifties.

By the early sixties graduates of other disciplines, notably mathematics, were being encouraged and recruited into the public service. While most of the early Statisticians were mainly foreign trained, the development of Universities in the country made the Government start looking inwards. At the same time the need for subordinate staff necessitated focussing attention on training at subdegree level.

Through on the job experience and/or further training a staff with subdegree qualification can eventually rise to the statistician cadre. This description, though in the context of official statisticians, applies in a way to other categories of statisticians. Thus one becomes a statistician through:

i) formal acquisition of a degree (direct entry)
ii) rising from the ranks

7.4 INSTITUTIONAL FRAMEWORK

The framework for training statisticians more or less corresponds with the educational system already described.

Primary School Leavers: These join the service as enumerators or field assistant trainees. Through on the job training, they can gradually climb up the ladder and eventually acquire levels that they would otherwise have attained with secondary and tertiary qualifications.

Secondary School Leavers enter as statistical assistant or field assistant. They too can rise to high levels through on the job training or formal training at a higher institution.

Ordinarily all secondary school pupils offer English and Mathematics. Some schools now offer statistics as a single subject distinct from being part of additional mathematics.

Middle Level (intermediate) training institutions: There are basically two types of these institutions.

The first type are the *Colleges of Education or Advanced Teachers Colleges*. The graduates of these Colleges hold the National Certificate in Education. They are primarily trained to teach in primary and secondary schools. As at now the number of such colleges in the country stands at just over forty. Only a small number of these colleges offer statistics as one of the two-subject teaching combinations.

Polytechnics or *Colleges of Technology* constitute the second type. The training is of a two-tier nature; an ordinary National Diploma (OND) followed by the Higher Diploma (HND). There are about thirty such institutions, with only four of them offering OND/HND programmes in Statistics.

Though in most cases the Statistics programmes are located within Mathematics Departments, they are practically oriented. A typical syllabus will contain courses in Economics (including economic geography), mathematics, computer science, statistical theory and methods and applied statistics.

With minor variation here and there, the syllabus is fairly similar to the middle level guide syllabus recently prepared by the United Nations Economic Commission for Africa (ECA) (1982).

It might be mentioned that, prior to the introduction of statistics diploma programmes in Polytechnics, the University of Ibadan has been running a middle level (subdegree) programme called the Professional Diploma in Statistics. The programme, formerly based in the Economics Department, is now in the Statistics Department.

Professional Training (Universities). While the HND products of Polytechnics are recruited directly as professional statisticians by some organisations, the Universities or appropriately affiliated Institutes remain the main training ground for Statisticians.
The following programme hybrids exist in Nigerian Universities:

i) Conventional B.Sc. Statistics degree programme located in any one of departments of Statistics, Mathematics, Economics, or
ii) B.Sc. Mathematics or Economics with specialisation in Statistics

A Combination of both (i) and (ii) exists within the University in some cases.

iii) A Combined Applied Statistics and Demography Department does exist in one or two Universities.

7.5 DEGREE PROGRAMMES

B.Sc. (Statistics). Standard Courses in Statistical theory and methods (Standard in the sense of Britain and possibly America) are covered though at varying levels. In addition, most Universities offer courses in general applied Statistics while some have on their books various specialised applied courses, notably topics in official statistics.

Naturally, emphasis is guided in many cases by the departmental/faculty location of the programme.

A project work involving real life data handling and/or appraisal is now a compulsory part of the degree programme.

B.Sc. (Maths). In general, this is essentially a Mathematics degree. The level of statistics specialisation varies considerably. At the one extreme some introduction to probability and distribution theory is all the student gets.

At the other extreme we have a whole range of statistics courses almost comparable with that for a B.Sc. (Stat.). This is particularly the intention in the newly established Federal Universities of Technology. The degree to be offered in these Technological Universities is indeed a degree in industrial mathematics.

One or two older Universities like Benin already offer such a programme.

B.Sc. (Econ.). Like the Mathematics degree, this is basically an economics degree with considerable variations in the amount and standard of statistics contents.

What should be taught?

There may be as many answers as there are teachers and employers. The ideal is one thing, the practicable is another. However, if we see the training of a statistician as the provision of a kit of tools similar to that of the trainee mechanic, the divergencies may be narrowed. The trainee mechanic can never tell what job will come his way and when, but common mechanical faults call for the inclusion of some basic tools in his kit.

To debate the issue here would produce something out of proportion with the paper. Suffice it to say that with the exception of a few centres, there is some general agreement on the following basics.

> Probability and distribution theory; statistical inference; sample survey; design of experiments; general statistical methods; some special methods e.g. nonparametric, sequential: multivariate analysis; time series; applied statistics (albeit in various guises).
>
> Mathematics and some computing are now also fairly common to all programmes. Such topics as stochastic processes, operations research, biometry, econometrics, demography etc. though not common to all, can be found in many institutions.

In the Nigerian context and indeed Africa generally, it would appear that some introduction to official statistics possibly through a socio-economic statistics course is desirable. Some institutions already have such courses.

How far one goes from here would perhaps depend on the job market. The ongoing attempt by the ECA to provide a guide syllabus which makes allowance for some broad potential job possibilities with some foresight for the statistician's future needs seems a step in the right direction.

Needless to say, *how* we teach things is of equal importance.

7.6 SHORT-TERM SPECIALISED TRAINING

Though Ibadan does offer some periodic summer workshops primarily for users of statistics, there are no institutions that offer formal and

regular short-term training designed to improve the skill of practising statisticians. Some of the Overseas centres currently being used include the International Statistical Programme Centre in Washington, Bureau of Labour Statistics, Munich Centre for Advanced Training in Applied Statistics, University of Kent Applied Statistics Unit, University of Reading Statistical Service Centre, International Statistical Education Centre, Calcutta etc.

There is no doubt that such training will sooner rather than later have to be undertaken locally. This possibility is already being examined by government.

7.7 POSTGRADUATE TRAINING

A number of Universities now offer training up to M.Sc. level. The one year programme is generally by course work with some form of dissertation based in project work. A smaller number, notably Ibadan and Nsukka go up to the Ph.D. More are planning to do so.

Another postgraduate programme worth mentioning is the Diploma programme run by Ibadan. It is a programme designed primarily for nonstatistics graduates mostly already in employment. The expected improved knowledge is meant to prepare the graduates for return to their employment. In some cases, the programme also serves as a gap filler for advancement to the M.Sc.

A possible reorientation of the programme may certainly prove useful in producing some form of specialised training for serving statisticians.

7.8 CO-ORDINATION AND STANDARDS

With increasing number of institutions offering various forms of statistics training programme, the issue of coordination and standardisation necessarily arises. Coordination is necessary:

i) to prevent excessive overproduction or under production of graduates.
ii) unnecessary proliferation and duplication with implication for efficient management of the Nation's resources.

Those governmental agencies that are expected to take care of this are the National Manpower Board, the National Universities Commission (NUC) and the National Board for Technical Education (NBTE).

The NUC and the NBTE play some role of watch dog for Universities and polytechnics respectively. For such professional programmes as medicine, engineering, pharmacy etc. there exist acredited bodies that can do necessary monitoring for the NUC as far as standards are concerned.

Unfortunately no such body exists for Statistics. From all indications, as the Nigerian Statistical Association gets stronger, it may have a role to play in the matter.

The National Advisory Committee on Statistics, though not an accrediting body has in the past had a say in providing some form of guide B.Sc. syllabus to be used in Nigerian Universities. Nothing in its terms of reference prevents it from still playing some more effective role.

The practice of the use of external examiners by the Universities is one helpful way of at least preventing absurdities in the standards.

It is worth mentioning that the issue of curriculum and related matters is currently being examined by the Federal Government.

7.9 THE TASK

From an ongoing survey of Training Institutions in the country, it seems that the problems in the production of practically oriented statisticians lie in the needs for appropriately qualified staff, teaching materials (books etc.) especially in the specialised applied socio-economic areas and computing facilities to mention a few.

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CHAPTER 8

The Training of Statisticians in Argentina

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8.1 INTRODUCTION: THE ARGENTINE EDUCATIONAL SYSTEM

Argentina is a republic ruled by a federal system of government, divided into 22 provinces, 1 territory and the capital (the city of Buenos Aires), and with a current population estimated at nearly 30 million inhabitants. The basic principles of education in the country were established in 1884 by law No. 1420, in which the Federal Council of Education was established.

Education is divided into the primary, secondary, tertiary and university levels. Public primary and secondary schools belong to federal and provincial systems, as well as to some local governments, and public universities belong to a federal system. All of them are free for the students. At each level there also exist private educational institutions. Table 1 shows total enrolment in 1984, and percentages corresponding to the public sector.

Primary education is compulsory for all children between 6 and 14 years of age. The standard program lasts seven years, and is aimed at 'stimulating and guiding the intellectual, physical and behavioral development of children' in those ages. In some provinces the first three years have a system of automatic promotion. In rural areas special programs are offered. There also exists a program of 'adult education' devoted to persons with ages exceeding those of the primary school level.

Secondary education is implemented with different objectives in view, and the duration of the studies (typically between 4 and 6 years) varies depending upon these objectives. Basically there are the following types of secondary schools: humanistic, commercial, agronomic, technical, artistic, biological, and others.

Tertiary education prepares teachers and professors: the former are accredited to teach in primary schools, the latter to do so in secondary schools.

There is a total of 52 universities operating in Argentina in 1985. Table 2 shows total enrolment in 1984, and total number of diplomas granted in 1979 by the 8 largest public universities.

Universities are usually divided into 'facultades' (schools) whose main responsibility is to conduct the teaching programs in related areas. For example, in 1984 the University of Buenos Aires consisted of the following schools, with percentages of total enrolment: Economics and