Statistics training for users and general public: A Proposal

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Abstract

The paper is looking at the development of statistics in the African continent from the users'
side. This is because there have been enormous efforts in improving statistical production
(supply) in the continent since the early 1960s through training of statisticians to handle this
noble task. Various meetings, conferences, workshops, seminars (both organised internally
and internationally) have been organised under the auspices of the United Nations
Commission for Africa (UNECA), the African Development Bank (AfDB) and other
development partners toward this direction. The use of statistics is still at low level, and non-
existent in some instances. Over five decades development of statistics has been approached
on the supply side, that is, training producers, with a belief that they will be able to produce
enough statistics to satisfy the users. However, if users are ignorant of these statistics they
will not use them, thus lowering their demand. The paper, therefore, attempts to recommend a
different approach towards improving the supply and use of statistics in the continent by
training users of statistics such that they shall raise their demand.

Key words: Statistics producers, statistics users, statistics training, statistical knowledge,
              statistics.

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1. Introduction

African countries are at crossroads in their attempt to sustain the production of statistics for various uses; planning, monitoring and evaluating various projects and programmes, and decision making. Since the early 1960s there have been efforts to train statistical personnel to this effect, however, this endeavour has faced a lot of challenges. Among them is the inadequacy funding to Statistical Training Centres (STC) which were established in the region, civil conflicts, the new management of UNECA abolishing the Statistical and Demographic Division in the mid -1990s, of late, there is absence of harmonised statistical syllabuses in the African STCs, and inadequacy of specialised statisticians (Ntozi, 2011). Thabane, et al (2008) have pointed out that statisticians working in Africa encounter the following challenges;

- Limited opportunities for career development. In most Africa countries, statistics are perceived to be driven and required by governments, akin to a by-product;

- Lack of appreciation of the power of information by governments, leading to poor funding, incentives and motivation arrangements for statisticians;

- Professional "pressure" – the field is not lucrative enough compared to other professions;

- Lack of learning materials based on the specific African experience and practices;

- Adaptation of foreign practices to local conditions, leading to poorly sustained capacity;

- Lack of adequate in-service training programs;

- Poorly informed society – inadequate statistical literacy;

- Poor ICT policy (education, curriculum, etc.);

- Lack of a professional ethics code;

- Lack of regulatory bodies on statistical practices (i.e. a code of conduct);

- Poor on-the-job training, including the lack of mentorship programs; and

- Poor administrative structures (administrative boundaries, mobile population, fluid economies, governance, etc.).

The above are just some of challenges that are encountered by people working or aspiring to work in statistics production. Statistical ignorance on the part of government organs is the major challenge faced by the profession.

Tulyamuhika (1990) pointed out that production of statistics and use in the African Continent is faced with a number of challenges. The major one may be the sociological matter where most Africans do not like to concede ignorance in anything. He stated that "…Generally, African sociology has been arrested, partly by the incidence of colonialism, after centuries in an unscientific, anti-developmental strait-jacket. The scientific method does not run easy in African sociology. To say "I don't know" is the most shameful admission in most African societies. This implies the African "knows everything". Does he need a statistician? At the end of the day, African backwardness can be easily explained by a lack of willingness to manage information, a lack of capacity to manage information, a lack of admission of ignorance and lack of knowledge of where to go to repair that defect…"

Most Africans take action on anything as a result of personal intuition and feelings. At times results of their actions become positive because of sheer luck, and failures are thought to be just bad luck and nobody is taken accountable to it. The continent has experienced a lot of upheavals not necessarily because of lack of resources or anything else but among many

challenges is the inability to use statistics in managing their socio-economic issues. In their documentary film entitled "Measuring the change in the World Poverty" PARIS21 (2002) have indicated that "you cannot measure it, you cannot manage it". So when one considers African countries efforts to manage their undertakings finds that there is inadequate production of the needed statistics in order to manage these affairs.

With this information at hand one is compelled to think from the other end, the users instead of the producers. The low development of statistics in the continent may be partly a result of the ignorance of users. Very few people study statistics in their formal education (because it is taken as mathematical subject) (Msokwa, 2014). The same notion continues to working places where statisticians are regarded as mathematicians who have nothing to do with real life matters. The situation is further compounded by the inability of statisticians in communicating the "stories' that these "numbers" are intended to tell in relation to peoples' daily life. This pushes statistics to the corridors of neglected matters. It is hoped that should users be trained on the powers statistics have in managing their undertakings, they will push producers to supply the needed information, thus breaking the vicious cycle of statistical underdevelopment.

2. Current statistics training initiatives

Training of contemporary statisticians is approached much form the academic side. Developed and administered curricula hinges on the classroom results rather than practical training. Testing of students on the understanding of courses is measured on written examinations and not practical work on the application of theories and methods in the real world. Most statistical courses are taught in three years upon which a graduate is awarded

a bachelor degree. A student is awarded a masters' degree after studying more one or two years after the first degree. At bachelor degree's level students are awarded qualifications through certificates that bear different titles like; BSc. Statistics, B.A. Statistics, and B. Statistics (UDSM (2013), UONBI (2014), MUK (2014). Looking at the course contents of these institutions, it is found that majority of them are mathematically oriented. This may be partly fine for training statisticians for the production of statistics but not for the users. The low use and appreciation of statistics in the real world may be attributed to this effect, such that producers continue to produce statistics without considering the needs and understanding of users.

Given that there are few professional trained statistical producers (professional statisticians) which is now coupled with the low use, we end up having the vicious cycle of statistical negligence by governments. After a while, producers realise that there is low or absence of appreciation of their efforts because their products are not used, users on the other hand feel that their living do not necessarily need any statistics.

3. New training proposals

There are three different populations that should be trained in statistics to enable the continent to forge ahead with its endeavour of socio-economic development of its people. These are; practicing statisticians, practicing non-statistical officials, and future citizens.

3.1 Retraining of practicing statisticians

It has been claimed in various fora that statisticians are bad communicators because they are used to handling numbers most of the time. Most statisticians are good at producing

data and statistics but struggle to package and disseminate them to users in the format that they are easily comprehendible. More often than not produce volumes and volumes full of tables without or with very little descriptions about their contents. They assume that users will be able to find their way of understanding them. The end result is that most publications made by statistical offices end up gathering dust in the shelves of would be users. ….”water, water everywhere but no water to drink”….. (PARIS21, 2002).

The first task has to be to orient practicing statisticians on how to communicate their products (statistics) to the public. There are such efforts in some countries such as the Royal Statistical Society (RSS) in the United Kingdom (UK), through their initiative on a programme of "statistical ambassador initiative". The programme intends to engage statisticians at the early professional career to communicate statistics to the public using various media. The GIZ – Germany has a training programme on "Public Relations and Statistics: Building Bridges between Producers and Users". The training programme brings together producers and users of statistics in one class and make them interact. This enables each side to see/learn the other's position in this aspect. The end result of this programme will enable statistician package various outputs according to different user needs.

3.2 Retraining of practicing non-statistical officials

The first thing that has to be done is to orient all officials working in various areas that statistics are part of their life. Rao put it very well that "Statistics is not a discipline like physics, chemistry or biology where we study a subject to solve problems in the same subject. We study statistics with the main aim of solving problems in other disciplines" (Stat Quote, 2014). It goes without more emphasis that our life is a game of statistics.

Nothing can properly be managed without the use of statistics in one way or another. We all count our ages in years, go to work at a particular time, spend a certain amount money on particular item, count our goats we have at home, prepare meals in relation to a number of people around, count amount of money we have in our pockets at any particular moment, and so on.

When one looks at the examples listed above, can easily be led astray that if that is what we do daily, then everybody is already a statistician and therefore need no more training. However, things look like a bit easier at individual level, where no one is compelled to keep a record of all what he is doing on a daily basis, though at times we need to do so even at this level. For example, one may keep some data of total expenditure on different items for a day or week or month or year.

Recording and using properly recorded statistics becomes more prevalent when it comes to societal levels. A society at any level be it a village, ward, district, region and nation need to have a systematic way of producing and managing statistics in their areas of work for their own use. More sophisticated systems are needed to collect, manage, process, analyse and disseminate these statistics to various users at different levels of the society.

3.3 Statistics training for future citizens

3.3.1 Compulsory statistics modules to every citizen

In order to make a breakthrough in its bondage of socio-economic underdevelopment, African countries should start imparting statistical thinking to their citizens' right from the tender ages. Time has come when all plans, policies and decision making at any societal level have to be backed with statistics. This means that all citizens have to be statistically literate. To achieve this calls for Statistics Discipline to be taught to

all citizens in all levels of education. This will necessitate the development of various

syllabuses to suit all citizens in both formal and informal education system, such that

on their graduation they will be at least literate on the use of statistics.

The following topics are suggested to be studied by all people in formal education

systems right from primary schools to tertiary levels:

- Why should statistics be produced? (uses of statistics)

    o Needed to understand current situations

    o Needed to make decisions

    o Needed to project the future and plan

- Understanding types of data

    o Qualitative data

        ▪ Binary

        ▪ Nominal

        ▪ Ordinal

    o Quantitative data

        ▪ Discrete

        ▪ Continuous

- Statistics production process

    o Who initiates the need for statistics

    o Data collection; both primary and secondary

    o Data processing and analysis

    o Presentation of results and report writing

    o Dissemination/sharing of results (communicating statistics)

- Element sampling

- o Determinations of populations of interest for any study

  o Developing sampling frames

  o Different sampling designs

    - Simple random sampling

    - Stratified sampling

    - Cluster sampling

  o Means of selecting elementary units – representative samples

- Demography and labour statistics

  o Importance of understanding demographic issues in relation to various sectors

  o Demographic structure – sex by age

  o Demographic distribution in an area (village, ward, district, country, etc)

  o Demographic trends over time

  o Labour statistics

    - Economically active vs economically inactive

    - Employment vs unemployment

- Environment Statistics

  o Key concepts and definitions in environment issues

  o Areas of environmental concern in a society, district, region, country

  o Understanding the link between environment issues and the socio-economic aspects of a society

  o The need to measure environment issues

  o Scope of environment statistics

- o   Core set of environment statistics

- o   Sources of environment statistics

- o   Mani uses and users of environment statistics

- Production and management of Local Area Statistics

- o   A need for Local Area Statistics

- o   Key users' knowledge about statistics

- o   Type of statistics that can be produced in a local area

- o   Society's knowledge about statistics

- o   Availability of a statistical production system in an area

These topics have to be compulsory to everybody passing through the education system, irrespective of one's speciality. The topics do not demand any mathematical background but require a lot of logical thinking, which are pre-requisites to make a person to appreciate the power of statistics in our life and demand them to his day to day life. This will create a scenario of statistics to be demand driven and not supply driven as the case is at present.

3.3.2 Sector-wise statistics training

There are various sectors that exist in every country ranging from social to economic. Personnel working in each of these sectors are experts in their areas of specialisation. However, our collection shows that very few of them appreciate statistics associated with their sectors. For example, discussion with officials of many prominent Ministries in Tanzania found a lack of understanding on the need for them in collecting statistics for their own use. Most of them think their data needs are to be supplied by the National Bureau of Statistics (NBS).

Visits to their web-sites showed that they do not have any posting on statistics collected internally. Some do not have even a unit/department, leave alone, a section responsible for statistics. The practice is that some data can be gathered on ad-hoc basis just at a time they are needed, and the collection stops thereafter.

In order to appreciate the power of statistics within each sector, the following areas of statistics that need to be trained are proposed;

S/N	SECTOR/FIELD	STATISTICS TO BE TAUGHT
1.	Education	• Key concepts and definitions used in education statistics • Sources of data • Methods of data collection • Enrolment of students at every level of education • Enrolment ratios • Number of various text books and reference books for each subject (for primary and secondary schools) • Number of teachers per subject • Number of classrooms and classrooms' capacities • Number of dropouts in every level of education • Students/teachers ratios for different subjects • Students/textbook ratios • Number of desks • Graduates at every level of education by years • Government expenditure on education at every level – to a level of a school • Other sources of funds for schools expenditure

		• International Standard Classification of Education (ISCED) • Uses of education statistics
2.	Health and social welfare	• Key concepts and definitions used in Health and social welfare statistics • Sources of data • Scope of health statistics • Methods of data collection • Computation of various rates and ratios • Relationship between health statistics and other social-economic issues • Data on hospital infrastructure, equipment, and medical personnel, especially welfare matters • The use of hospital administrative records in generating health statistics • Classification of Diseases (International Classification of Diseases – ICD)
3.	Housing	• Key concepts and definitions used in housing statistics • Sources of data • Methods of data collection • Types of housing units in a society by geographic distribution • Quality of housing in a society: Size, Wall materials, Roof materials • Housing needs in a society • Prices of construction materials over time

		• Methods of financing and investment in housing
		• Types of housing by ownership
		• Houses by amenities
		• Occupancy rates of houses
		• Type of tenure by occupants
		• Periodic review of housing requirements in a society
5.	Accommodation and food service activities	• Key concepts and definitions used in accommodation and food related statistics
		• Sources of data
		• Scope of accommodation and food services statistics
		• Methods of data collection
		• Classifications used in accommodation and food services statistics
		• Frequency of data collection
		• Uses of accommodation and food services statistics
6.	Water supply and sanitation	• Key concepts and definitions used in water statistics
		• Sources of data
		• Methods of data collection
		• Scope of water statistics
		• Statistical units and classifications
		• Water data items
		• Water and the ecosystem
		• Water and climatic change
		• Water and food statistics
		• Water and urbanisation statistics

		• Water and hydropower generation statistics

7.	Agriculture	• Key concepts and definitions used in Agricultural statistics
		
		• Sources of data
		
		• Methods of data collection
		
		• Area statistics
		
		• Compilation of statistics on crop production
		
		  • Cash crops
		
		  • Food crops
		
		• Compilation of statistics on livestock and products
		
		  • Statistics on different types of livestock
		
		  • Statistics on different products of livestock
		
		  • Statistics of livestock holders and their distribution within a country
		
		• Compilation of statistics on fisheries and products
		
		• Compilation of statistics on forestry and products

8.	Manufacturing	• Key concepts and definitions used in processing industries production statistics • Sources of data • Methods of data collection • Classifications in the processing industries sector • Gross production statistics • Cost of inputs • Value added • Computation of Index for production for processing industries and their uses

9.	Trade	• Key concepts and definitions used in external trade statistics
		• Scope of external trade statistics
		• Sources of data
		• Methods of data collection
		• Different valuations used in external trade statistics
		• Frequency of data collection
		• Computation and interpretation of export and import index numbers
		• Compilation of external trade statistics by mode of transport
		• Uses of external trade statistics
		• Different classifications used in external trade statistics
		• Standard International Trade Classification (SITC)
		• Central Product Classification (CPC)
		• Harmonized Commodity Description and Coding System (HS)
		• Key concepts and definitions used in distributive trade statistics
		• Scope of distributive trade statistics
		• Sources of data
		• Methods of data collection
		• Scope of distributive trade statistics
		• Different classifications used in distributive trade
		• Data items that are collected for distributive trade
		• Importance of compiling distributive trade statistics

10.	Transport	• Key concepts and definitions used in transport statistics • Sources of data • Methods used in collecting transport statistics • Scope of transport statistics • Frequency of data collection • Importance of collecting transport statistics

11.	Construction	• Key concepts and definitions used in construction statistics
		
		• Scope of construction statistics
		
		• Special features of the construction industry
		
		• Composition of construction industry
		
		• Special needs for construction statistics
		
		• Sources of data
		
		• Frequency of data collection
		
		• Value added in construction industry
		
		• Construction indicators
		
		    • Production
		
		    • Construction costs and prices
		
		    • Building permits
		
		• Computation and interpretation of construction cost index

12.	Infrastructure	• Key concepts and definitions used in Infrastructure Statistics • Major characteristics of infrastructure • Sources of data

		• Scope of Infrastructure Statistics • Need and role of infrastructure statistics • Methods of data collection • Classification of infrastructure statistics
13.	Energy	• Key concepts and definitions used in energy statistics • Sources of data • Scope of energy statistics • Methods of data collection • Frequency of data collection • Energy supply and demand – trends and prospects
14.	Mining and quarrying	• Key concepts and definitions used in mining and quarrying statistics • Sources of data • Scope of mining and quarrying statistics • Data items on mining and quarrying • Methods of data collection • Link between mining and other socio-economic sectors
15.	Information and Communication Technology (ICT)	• Key concepts and definitions used in information and communication technology statistics • Sources of data • Scope of information and communication technology statistics • Methods of data collection • Classification of information and communication technology statistics

		• Link of information and communication technology sector to other sectors, and thus statistics
		• Statistics on availability vs accessibility of information and communication technology facilities to the society, and their trends over time
18.	Criminal and Justice	• Key concepts and definitions used in criminal justice statistics
		• Scope of Criminal Justice Statistics
		• Sources of data
		• Methods of collecting criminal justice data
		• Components of criminal justice system
		• Need for developing a criminal justice statistical system
		• Qualitative description of the justice services
		• Organisational models for a national system of criminal justice system – Centralised Vs Decentralised
		• Processing of criminal justice data
		• Closure and disclosure of criminal justice statistics
		• The role of victimisation sample surveys and other data sources

It is hoped that should the above proposal be adapted by the education systems of the countries, soon we shall witness the statistically thinking society, to the delight of Wells (Stat Quote, 2014) who prophesised that "Statistical thinking will one day be as necessary a qualification for efficient citizenship as the ability to read and write". This should be the urge

of many countries now, especially the developing ones because they have to account for their activities to their people through the motto of "Results Based Management"

4. Conclusion

The earlier education systems in the countries embrace the proposed training the sooner shall be the shift in the socio-economic life of people in the societies. Without the statistical knowledge masses are cheated. This is like what Andrejs Dunkels (Stats Quote, 2014) stated that "It is easy to lie with statistics. It is hard to tell the truth without statistics." This means that if most of the people are ignorant of statistics they can easily be cheated with the use of fake figures. However, one has to be well prepared to convince a statistically knowledgeable society using statistics. That is why we think it is high time every citizen is taught at least statistics concerning his/her area of specialisation.

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