

The Role of SASA in overcoming challenges facing Statisticians in South Africa

Introduction

Distinguished guests, ladies and gentleman: good morning to you. When I was approached to serve as the SASA President I accepted the role with great trepidation. Having been actively involved in the organisation for many years, I embraced this unique opportunity to help guide and steer our association in addressing some of the challenges that face us as statisticians.

The activities and interactions in this role presented me with a steep learning curve, however, my experience on the EC and my interactions with Past Presidents equipped me well for the role. All in all it presented me with an opportunity to engage on matters that I wouldn't ordinarily have been exposed to if I were not in this position and it has contributed immensely to my personal growth. The reason I am sharing this personal reflection with you is to encourage our membership, especially our younger members, to become involved in **our** association and to serve and celebrate our discipline.

One of the major undertakings by the executive committee this year was the revision of the SASA constitution. Thus, having had to review the constitution a number of times during this process, I had many occasions to reflect on the missions and goals of SASA as an organisation and whether we are successfully addressing these goals.

The constitution states that "The mission of the Association shall be to foster the study and knowledge of statistical theory and its application towards improving the quality of life of all South Africans."

In my address this morning, I have chosen to highlight a few issues facing us as Statisticians, more specifically as Statisticians in South Africa. I ask **that you** reflect on these challenges and to consider the role that SASA and **you**, it's members need to play in addressing these issues.

SASA as an organization:

SASA has been in existence for 57 years and the SASA membership has grown to approximately 414 members from the initial membership of approximately thirty members when it was formed in 1953 with Prof J.B Loor as the first President. The first conference was held in 1958 with 18 papers being read – the membership being 60 at the time. At the conference this week, you will have the option of choosing from approximately 151 presentations on a wide variety of topics spanning discussions in education, business, quality control, finance, government, health, natural and social sciences - to name a few. This wide selection of choice bears testament that statistics and its methodology form an essential scientific pillar for a number of fields. This further strengthens **our** belief that Statistics is popular, relevant and very much alive and well!

However, I bravely say to you, that for many: “Statistics is a mystery” – I am not saying this in the same vein as that of a frustrated student when contemplating on the subject, but in terms of the irrational relationship described by Hand (2008) when he speaks of the “Puzzling contradiction between the fundamental excitement of statistics and its poor public image”.

These sentiments are also expressed by Professor Bradley Efron: “During the 20th Century statistical thinking and methodology have become the scientific framework for literally dozens of fields including education, agriculture, economics, biology, and medicine, and with increasing influence recently on the hard sciences such as astronomy, geology, and physics. In other words, we have grown from a small obscure field into a big obscure field.”

I am sure that everyone in this room can attest to experiencing that deathly silence or gasps of horror during a casual conversation when revealing that you are a statistician.

So, why this paradox: Poor public image of Statistics co-existing with the huge social need?

This could be due to a number of reasons:

- **Mistrust in statistics:** this has been caused by the misuse of statistics when people intentionally omit or criticize statistics that do not support their standpoint. This image is further denigrated by quotes popularized in the media for example the infamous: “There are three kinds of lies: lies, damned lies, and statistics” (**Mark Twain/ Benjamin Disraeli**).

The recent initiative by the United Nations of declaring the 20th October as World Statistics day was aimed at addressing the issues of trust and awareness surrounding Statistics. In describing why a world statistics day was necessary, the following explanation was given: “The celebration of the World Statistics Day will acknowledge the service provided by the global statistical system at national and international level, and hope to help strengthen the awareness and trust of the public in official statistics. It serves as an advocacy tool to further support the work of statisticians across different settings, cultures, and domains.”

In South Africa, the Statistician General, Pali Lehohla, has through the medium of the “Inside Statistics” column in the Business Report, been able to raise awareness about many issues in Statistics and in the process also contributing to a transformation of the public’s negative image of statistics. Reflecting on SASA’s missions and goals, more specifically the pledge in the constitution that “by promoting public understanding of those statistical concepts which enhance critical faculties and effective citizenship, and fostering public appreciation of sound statistical practice”; as statisticians, it is our responsibility to speak out and offer corrective commentary and explanations that will help improve society’s understanding of our discipline especially when we see statistics being misused in the media.

Another reason for the poor public image is that people are unaware of where statistics can be applied.

- **Limited exposure of where statistics can be applied** Through the media, the public would often encounter the use of statistics in sport and perhaps in government but they are unaware of the vast applications and importance for statistics in fields like epidemiology, global warming and climate control, drug developments and so on.

Further, a popular culprit for this poor perception is that:

- **Statistics is only about deriving mathematical equations.** This is partly due to the approach traditionally used to teach statistics coupled with the occurrence that statistics departments usually resided within Mathematics departments, and that you have to be very good with manually manipulating large amounts of numbers to be successful in it- a perception we all know has changed with the advent of computers. The dilemma of a population that is largely innumerate further exacerbates the fallacy that the subject has no relevance or use for the general members of society.

Reflecting on these issues, I would like to remind you again of SASA's pledge that "The Association shall strive to accomplish this mission by promoting public understanding of those statistical concepts which enhance critical faculties and effective citizenship, and fostering public appreciation of sound statistical practice." Further, I would like you to consider the sentiments of Andrew Grieve that "The discipline of statistics itself cannot influence, cannot persuade, cannot interact, cannot design, cannot analyse and cannot interpret. Statisticians can, and do".

I think that SASA has in some ways begun to address these issues; however, we still need to focus on image building for our discipline and to actively promote the visibility and importance of the subject at schools, universities and for the general public at large.

Internationally and nationally there has been a drive emphasising managing for results toward formulating informed strategies in order to achieve the millennium development goals (MDGs) arising from the United Nations Millennium Summit in 2000. The eight development priorities are summarized as follows:

1. To eradicate extreme poverty and hunger
2. To achieve universal primary education
3. To promote gender equality and empower women
4. To reduce child mortality
5. To improve maternal health
6. To combat HIV/AIDS, malaria and other diseases
7. To ensure environmental sustainability
8. To develop a global partnership for development

Our government has realized the importance of statistics in making informed decisions. Governments drive for evidence-based policy making through the establishment of an evaluation, monitoring and planning commission within the presidency, and in government departments from national down to local level has led to an increase in the demand for expertise in monitoring and evaluation. In the country MDG report (2010),

Minister Trevor Manuel states that “In order to make bold statements on progress or lack of it, we need statistics as the basis for evidence policy making. If you cannot measure it, you cannot manage it. We shall therefore appeal to our partners that we hold hands in this endeavour of statistical development in and for Africa.” I would like to remind you that our constitution states further that we shall achieve our mission by “actively participating in appropriate processes and structures which impact on South African society”; hence SASA and its members form an important part of this partnership that Minister Manuel is referring to.

However to successfully address this demand, we require suitably qualified personnel to monitor and evaluate and at present we are facing a crisis in statistical capacity which is two-fold. There is a dire shortage of personnel who are trained to adequately address the magnitude of the monitoring and evaluation demands and secondly there is a shortage and a problem with retention of statisticians in academia which affects our ability to train adequately.

Building statistical capacity

Training more Statisticians

During this year, SASA has interacted closely with SAS and with the Statistician General (Stats SA) on the issue of building capacity. A memorandum of understanding (still a discussion document) has been drawn up between SASA and Stats SA and a similar initiative is underway with SAS to look at various ways in which the issue of capacity building can be addressed. One such initiative led by Stats SA has called for a collaborative effort between the academic institutions and the Statistical Institute (formed at Stats SA) to address the huge demand for training more statisticians in Official Statistics. SASA is aware of the crisis in academia at present with many university departments being under- staffed, however it urges the departments to consider these collaborative efforts against curricula which it presently offers as part of the existing academic program so that with a coordinated effort from various universities

and Statistics SA, some of the issues surrounding training of statisticians can be addressed jointly.

Shortage of statisticians in academia and the inability to retain them

A survey was undertaken in 2008 by the Past President (Herrie van Rooy) about the staffing situation of statistics departments at South African universities. Information received from 13 universities that responded to the survey revealed at the time that “within the next 5 years, the country will lose more than 50% of its statistical research capacity and post-graduate supervisors.” The survey summarized the following findings:

- “More than a quarter of current permanent members (27) are over the age of 55, 12 of whom will retire before the end of 2010.
- More than half the publications were authored by staff members older than 55 and less than 20% by members younger than 40.
- Half the Masters supervisors and more than half the PhD supervisors are above the age of 55. There are no PhD supervisors below the age of 40.
- Currently the average number of PhD students produced per year is less than 10.”

The Report on the Review of Mathematical Sciences Research (2009) and a paper by Botha and Prinsloo (2008) concurred with these sentiments that statistics was undergoing a crisis. Both studies pointed to an aging population of active researchers and the challenge of producing enough young researchers and academics to fill the available vacancies at university departments. The increased teaching loads due to the shortage of staff and larger classes further affects the quality and quantity of research produced. The high demand for statisticians in industry coupled with much higher salaries offered in these positions adds to the challenge of retaining these academics at university.

Both these reports highlighted that should this decline in academic staff continue, this will in turn impact on the supply of suitably trained applied statisticians for industry and government as there will be insufficient academic statisticians to offer this training.

Botha and Prinsloo (2008) point out that the shortage of academic statisticians is not unique to South Africa and although, there are many papers that look at and theorise the impact of the shortage in the international arena, this has been done to limited degree in South Africa. Hence they call for further research by opening the discourse on the present situation. They urge academic statisticians to “invite industry to participate in networks of learning” and also harshly criticize academics for remaining in an ivory tower and excluding industry, society and students from participating in the discourse about the nature of the discipline and its role in society.

They acknowledge that poor remuneration in academia also contributes to the mass exodus to industry and suggest that consulting work be done to supplement the income received. However, they also counter this discussion with the argument that the distinctive characteristic to be an academic is for the love of the discipline and teaching. Supported by Maslow’s hierarchy of needs, in my opinion, this ideal, is fast becoming unsustainable in today’s economy especially since these young academics starting off their careers would be preoccupied with satisfying their physiological needs and safety needs e.g.: living in a safe area, building financial reserves, etc before pursuing higher level motivators along the lines of self-fulfillment.

The recommendations from the Report on the Review of Mathematical Sciences Research (2009) state explicitly that “Top priority must be given to attracting and retaining a younger generation of statisticians.”

Given the audience here today, I thought that it would be worthy to quote some of the mechanisms suggested in the report to address this crisis:

a) “a short-term recruitment of statistics university staff from overseas.”

However following the argument by Botha, M. and Prinsloo, P. (2008) that the shortage is a world-wide problem, the viability of this suggestion may not be feasible and the remuneration not attractive enough.

b) “Partnerships with industry

The report suggests that an NRF-sponsored nationwide consultation between Departments of Statistics and relevant industries should be organised. The aim will be to use existing examples of academic/business partnerships and develop new models for cooperation, and initiate a process by which such partnerships become widespread across all universities. The point needs to be made that current industry demands on graduates is destroying the universities’ ability to produce enough for future needs. Examples of possible cooperation include: jointly funded academic positions; establishing positions that are split between university and business; joint workshops on industry problems that could lead to consultancy solutions; and joint research groups.

c) “Scarce skills” supplements

The inadequacy of scholarships and salaries for postgraduate students and academic staff is exacerbated by the market forces for statisticians. There is a case for “scarce skills” supplements for statistics academics.

d) Establishment of joint industry/academic posts

The establishment of joint industry/academic posts should be investigated, in particular industrial chairs in university departments.”

The SASA EC has been in collaboration with the Statistics Council to seek solutions on the way forward. Some ideas proposed were to investigate ways to fast-track current staff to be able to replace the large number of retiring staff, and the potential to replenish the pool of postgraduate supervisors, both in the short term, by using retired members of staff as supervisors and as mentors for younger staff to become supervisors. Representatives from SASA, the Statistician General and Statistics Council

met this year with HESA (Higher Education South Africa) to bring the problem to the fore but further avenues will need to be actively pursued to seek sustainable solutions to these problems.

Before I engage in the next point of discussion, I would like to remind you once more that our constitution further states, that “the association shall strive to accomplish the mission by creating a forum for attracting and nurturing statisticians in South Africa, and advancing their interests and also calls for cooperating with organizations and societies associated with disciplines that are broadly related to statistics.”

It is usually observed that statisticians in industry are identified by a variety of titles e.g. risk analyst, Biostatisticians, Econometricians, Biometricians, Data Miners etc and seldom by the title of Statistician. In attempting to address the theme of visibility and trust in statistics, and in addition to create an identity for the practising statistician, a recent initiative was undertaken by a group of statisticians in industry who formed the Institute for Certificated and Chartered Statisticians of South Africa (ICSSA). The SASA EC has welcomed this initiative and has been working closely with ICSSA to ensure that their bye-laws can be incorporated into the new SASA constitution.

By introducing an accreditation process for chartered and certificated statisticians, the initiative aims at indicating to the non-statistical community that the Statistician has achieved a suitable level of proficiency in the understanding and application of statistical methods, is accountable for his/her decisions and recommendations and is also bound by the code of conduct in the SASA constitution. Further it is hoped that with certification, larger numbers of students may be attracted to the profession which would assist in addressing the statistical capacity demands in the long term.

Personally, my mental picture of SASA has been that the association should serve as an umbrella body to represent and bring together Statisticians who are involved in the discipline be it in terms of the production, teaching or applications of statistics so that we may best serve the needs of the discipline. Hence, during my term as the President of

SASA, one of the aspects that I felt strongly about was the need to facilitate the necessary interactions toward a more inclusive and unified association. I believe that although the activities and interactions of SASA during this year have paved a strong foundation for this image to become a reality, there is a lot of work to be done by the EC and its membership!

In conclusion, I would like you as a SASA member to “ask not only, what your association will do for you, but, what you will do for your association” to ensure the longevity of our vibrant discipline!

References:

1. Botha, M. and Prinsloo, P. (2008) 'The crisis in academic statistics: an exploration', *Africa Education Review*, 5: 2, 169 -183
2. Grieve, A. P. (2005), The professionalization of the 'shoe clerk'. *Journal of the Royal Statistical Society: Series A (Statistics in Society)*, 168: 639–656.
3. Hand, D.J.(2009) Modern Statistics: the myth and the magic *J. R. Statist. Soc. A*, 172, *Part 2*, pp. 287-306
4. Herrie van Rooy (2008) Status of statistics departments. SASA newsletter.
5. Millennium Development goals country report 2010.
http://www.statssa.gov.za/news_archive/Docs/MDGR_2010.pdf
6. Origins of Statistics and Probability: Where, When, by whom and How.
www.statisticalforecasting.com/origin-statistics-probability.php